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Prevalence and Risk Factors Associated with Prehypertension among Young and Middle-Aged Health Check-Up Population in Guangzhou

Lulu Yan[1*] Xia Lu[2*] Yao Zhong[1] Man Lin[1] Fangfang Lu[2] Rui Wang[1] Tianhui You[1]

1.School of Nursing, Guangdong Pharmaceutical University, Guangzhou, Guangdong, 510000, China
2.Department of Epidemiology and Biostatistics, School of Public Health, Guangdong Pharmaceutical University, Guangzhou, Guangdong, 510000, China

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ABSTRACT

Objective: To provide basic information and theories for prehypertension early intervention, a systematic analysis of the epidemic status and risk factors among young and middle-aged was carried out here. **Methods:** This study relied on the data bank of a health check-up population of a class a tertiary general hospital in Guangdong province in 2015. Total 9540 young and middle-aged adults were enrolled, and 733 people were included to find out the effect with lifestyle in these crowd. Principal Components Analysis (PCA) of Factor (FA) was used to identify dietary patterns. The logistic regression model was used to find the risk factors of prehypertension. **Results:** Among 9540 young and middle-aged cases, the incidence of prehypertension was 36.6%. Moreover, the average age, proportion of male gender, overweight, FBG (fasting blood glucose), dyslipidemia, and hyperuricemia were significantly higher in the prehypertension group than in the optimal BP group. Multivariate logistic regression analysis indicated that age, total cholesterol, triglycerides, uric acid, body mass index and HR (heart rate) were risk factors, and female was a protective factor for prehypertension. Among 733 cases, the incidence of prehypertension was 35.1%. The proportion of smoking, drinking, physical workers, moderate and severe physical activity, and the intake of meat, dietary energy were significantly higher in the prehypertension group than in the optimal BP group. Dietary patterns included "meat model", "spice model", "main vegeTables model" and "high protein model". Multivariate logistic regression analysis indicated that age, drinking were risk factors for prehypertension, while dietary milk intake, dietary magnesium intake were protective factors. Conclusions: Prehypertension is highly prevalent in Guangzhou. However, education about effective lifestyle modifications as an alcohol limit, increasing the intake of dairy products, and magnesium may intervene in the development of prehypertension. But how to develop targeted interventions for such groups need to be further explored. The present study would lay the theoretical foundation and basic data for the next step.

**Corresponding Author:*
Lulu Yan,
School of Nursing, Guangdong Pharmaceutical University, Guangzhou, Guangdong, 510000, China;
E-mail: 872938648@.qq.com.
**These authors contributed equally to this study and share first authroship.*

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1. Introduction

The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) proposed a new blood pressure (BP) category, including120~139mmHg systolic BP (SBP) or 80~89mmHg diastolic BP (DBP), designated as 'prehypertension'(PHTN) in 2003 [1]. This proposal was based, at least in part, on a meta-analysis of 61 prospective studies, which indicated that mortality from ischemic heart disease and stroke in individuals aged 40 to 89 years increases in a log-linear relationship with BP, from levels as low as 115mmHg systolic and 75mmHg diastolic[2]. PHTN is not only a caveat to developing overt HTN, but it is a major health risk on its own. Prehypertensives were repeatedly reported to be subjected to approximately double the risk of cardiovascular disease (CVD) independent of progression to HTN in addition to other cardiovascular complications. The prevalence of HTN is up to 30~50% worldwide, as well as in many districts of China [3-5]. It is known that in China the prevalence of hypertension is significantly higher in the northern area than in the southern area because of the colder climate and high sodium intake[6]. Such regional factors may also affect the prevalence of HTN. However, the prevalence of HTN in Guangdong Province, southern China has been rarely reported.

Recent researches showed that lifestyle changes had an important role in lowering blood pressure and preventing and treating HTN. Our previous analyses also showed that the influence factors of PHTN, including overweight, dyslipidemia and impaired glucose metabolism, which were related to lifestyle[7]. In other words, identifying differences in healthy lifestyle factors between those with normal BP and those with PHTN could help to target intervention efforts aimed at preventing further increases in BP. Considering that prehypertensive individuals are prone to progress into frank hypertension, and most of them present with clustering of other cardiovascular risk factors[8-10]. Healthcare professionals should recommend lifestyle changes early to subjects with PHTN. However, since the incidence of CVD increased across the whole range of PHTN, physicians should be aware of which subgroup of the population are at high risk for CVD and of steps that should be taken to treat modifiable risk factors in these people. At present, the study of PHTN in Guangzhou is common in community residents, but the epidemiological data of the young and middle-aged people is not comprehensive enough. Given the above situations, we conducted a cross-sectional study of a health check-up population of a class a tertiary general hospital in Guangdong province in 2015. In this study, the influence factors and status of PHTN in young and middle-aged check-up population were analyzed. The influence factors of HTN were explored to provide a theoretical basis for the further development of the prevention and treatment of PHTN.

2. Methods

2.1 Study Participants

We performed a cross-sectional study in Guangzhou, using health check-up population information. The information on health check-up population was collected in the Health Management Center of First Affiliated Hospital of Guangdong Pharmaceutical University. The center provided data for participants who enrolled in their health check-up programs conducted between January and December 2015.

Total 9540 young and middle-aged (18~44, young-aged; 45~59, middle-aged) participants, with complete data for the following characteristics, were included in this study: age, gender, smoking/drinking habits, height, weight, BP, fasting plasma glucose (FPG), total cholesterol (TC), triglycerides (TG), low-density lipoprotein-cholesterol (LDL-C), high-density lipoprotein-cholesterol (HDL-C), blood urea nitrogen and serum uric acid (UA).

Using the simple random sampling method to estimate the minimum sample size: $N=Z_{\alpha}^{2}PQ/\delta^{2}$. N: sample number; P: estimated incidence of PHTN; Q: 1-P; $\alpha=0.05$, $Z_{\alpha}=1.96$; δ: Permissible error, $\delta=0.1P$. Combined with the results of previous studies and literature data, the sample size of the sample is estimated to be P equal to 35.0%, then N=713. The survey was a total of 874 questionnaires recovered, a waste of 141 copies, and valid questionnaires of 733, which were collected in a sample of 9540 young and middle-aged participants. The 733 participants were selected to analyze their demographic data, health status, and dietary status through questionnaires.

2.2 BP Measurement

Participants were asked to avoid caffeinated beverages, smoking, and exercise for at least 30min, and BP measurements were taken after the participants were allowed to rest quietly for at least 5min. Three BP measurements (2min between each) were obtained for each individual by trained nurses, who were part of the Health Management Center, with a mercury sphygmomanometer. The first and fifth Korotkoff sounds were recorded as SBP and DBP, respectively. During the measurements, the participants were seated with the arm supported at the level of the heart. The mean of three BP measurements was calculated and recorded.

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2.3 Grouping Criteria

The correlative risk factors estimated in our study included the following: (1) BP classification was based on the recommendations from the JNC 7 [1]. Optimal BP was defined as SBP <120mmHg and DBP <80mmHg. HTN was defined as SBP ≥140mmHg and/or DBP ≥90mmHg, or previously diagnosed as HTN and currently undergoing antihypertensive treatment. PHTN was defined if individuals were not undergoing antihypertensive treatment and had an SBP of 120–139mmHg and/or DBP of 80–89mmHg. Diabetes was diagnosed according to the criteria of the World Health Organization (WHO), 1999 [11], and American Diabetes Association (ADA), 2003 [12]. The criteria included a fasting plasma glucose (FPG) ≥7.0mmol/L (126 mg/dL) and/or being on medical treatment for diabetes with insulin or other antihyperglycemic agents. Impaired fasting glucose was defined as an FPG level between 6.1 and 7.0mmol/L. According to the criteria of China adult dyslipidemia prevention guidelines [13], dyslipidemia was defined as TG >1.7 mmol/L, TC≥5.18 mmol/L, LDL-C≥3.37 mmol/L, or HDL-C <0.91 mmol/L. hyperuricemia was defined as UA ≥416μmol/L in men and 357μmol/L in women. (3) The body mass index values were grouped into four categories in both males and females as low weight (BMI <18.5 kg/m^2), normal weight (BMI of 18.5 to 24.0 kg/m^2), overweight (BMI of 24.0 to 27.9 kg/m^2), and obesity (BMI ≥28.0 kg/m^2) [14].

2.4 Questionnaire Survey

The baseline survey was completed by in-person interview using a structured questionnaire designed to collect information on demographic characteristics, health status, and dietary status.

2.5 Definition of Correlative Risk Factors

Smokers were classified as those who reported having smoked at least 1 cigarette every day and still smoked more than 6 months. Passive smokers were defined as those who inhaled the smoke exhaled by the smoker for more than 15 minutes at least one day a week. Alcohol use was defined as one drink per day and still drank more than 6 months, and each alcohol intake was at least 30g. The calculation of alcohol intake: alcohol consumption * alcohol content * 80%= intake of alcohol. According to the mental and physical standards-based workers were divided into mental and physical-based workers. Work intensity was divided into easy, general, tension, and fatigue. Physical activity was defined as the daily physical activity and was divided into mild, moderate and severe.

2.6 Assessment of Dietary Intake

Dietary information was collected via an in-person interview using a validated food frequency questionnaire (FFQ) [15]. The FFQ included 36 food items. For each food item or food group, participants were asked how frequently (daily, weekly, monthly, yearly, or never) they consumed the food or food group, followed by a question on the amount of consumption in Liang (1 Liang=50g) per unit of time over the past 12 months. For seasonal food consumption (mainly fruits and vegeTables), an additional question about months of food consumption per year was asked. Total intake of nutrients, minerals, and vitamin was calculated using the China Food Composition Table and Chinese Dietary Reference Intakes in 2013.

2.7 Ethics Statement

This study has been reviewed, discussed, and approved by the Ethics Committee of the Guangdong Pharmaceutical University. All subjects provided written informed consent.

2.8 Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Science software release V.16.0 (SPSS Inc, Chicago, Illinois, USA). Continuous variables are presented as mean (SD) or median (IQR) as appropriate. Categorical variables are expressed as percentages. After testing for normality using the Kolmogorov-Smirnov test, continuous variables were compared using a t-test or the Mann-Whitney U test, and categorical variables were compared by χ^2 test or Fisher's exact test as appropriate. Using the FACTOR procedure in SAS V9.2 (SAS Institute, Cary, NC, USA), principal component analysis (PCA) was performed to identify the dietary patterns of the subjects. Multiple logistic regression analysis was performed to evaluate predictive factors for PHTN. Individuals with optimal BP were used as the reference group. A value of $p<0.05$ was considered statistically significant.

3. Results

3.1 Prevalence of PHTN

9540 cases (5750 men, 3790 women) were eventually analyzed. The proportions of optimal BP, PHTN, and HTN were 43.9% (4188 cases), 36.6% (3491 cases), and 19.5% (1861 cases), respectively. The prevalence of PHTN was higher in men than in women (40.5% vs30.7%, $p<0.001$). There was an increasing trend of PHTN prevalence associated with age in women, while the prevalence of PHTN

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in men was sTable with age (Table 1).

Table 1. Prevalence of PHTN and HTN by gender and age group

Age (Years)	n	Optimal BP(%)	PHTN (%)	HTN (%)
Male				
18~	272	45.6	45.2	9.2
25~	988	48.0	43.5	8.5
35~	1536	38.6	40.2	21.2
45~	2257	28.7	39.5	31.9
≥55	697	22.1	38.0	39.9
Total	5750	34.6	40.5	24.9
Female				
18~	145	79.3	20.0	0.7
25~	710	78.0	19.6	2.4
35~	1238	62.9	28.4	8.6
45~	1524	45.9	36.9	17.2
≥55	173	27.7	48.0	24.3
Total	3790	57.9	30.7	11.4
All				
18~	417	57.3	36.5	6.2
25~	1698	60.5	33.5	5.9
35~	2774	49.5	34.9	15.6
45~	3781	35.6	38.4	25.9
≥55	870	23.2	40.0	36.8
Total	9540	43.9	36.6	19.5

3.2 Risk Factors Clustering in Different Blood Pressure Statuses

The average age, proportion of male gender, IFG, dyslipidemia, hyperuricemia, overweight, obesity, levels of FPG, TC, TG, BMI, and UA were significantly higher in the PHTN and HTN groups than in the optimal BP group (all p<0.05). The proportions of obesity and level of LDL-C were also higher in the PHTN group than in the optimal BP group (all p<0.05); however, the differences were not significant in the PHTN group compared with that in the HTN group (Table 2).

Table 2. Cardiovascular Risk factors clustering in different blood pressure statuses

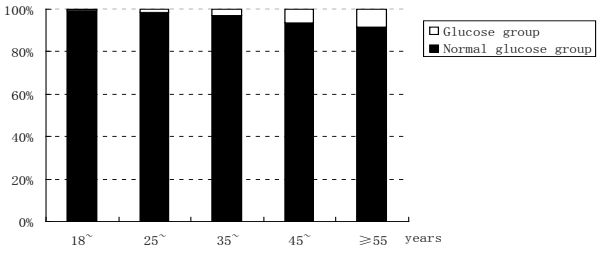
Items	Optimal BP（n=4188）	PHTN（n=3491）	HTN（n=1861）	Statistic（*F*-value）	*P*-value
Age (Years)	40.08±9.58	43.18±9.58*	47.36±7.65 #	409.648	<0.001
Male (n(%))	1992 (47.6)	2326 (66.6) *	1432 (76.9) #	557.472	<0.001
FPG (mmol /L)	4.64±0.71	4.83±0.96*	5.18±1.49 #	194.870	<0.001
IFG (n(%))	85（2.0）	149（4.3）	211（11.3）#	252.991	<0.001
TC (mmol /L)	4.92±0.91	5.18±0.95*	5.34±0.97 #	153.376	<0.001
TG (mmol /L)	1.38±1.11	1.82±1.44*	2.37±1.89 #	322.952	<0.001
HDLC (mmol /L)	1.47±0.26	1.42±0.25*	1.38±0.23 #	99.371	<0.001
LDLC (mmol /L)	2.83±0.75	2.95±0.81*	2.95±0.85	28.305	<0.001
dyslipidemia (n(%))	1360（32.5）	1740（49.8）*	1240（66.5）#	367.897	<0.001
UA（μmol/L）	331.37±86.85	368.09±92.60*	400.74±94.71 #	410.032	<0.001
Hyperuicaemia (n(%))	859（20.5）	1111（31.8）*	835（44.9）#	383.978	<0.001
BMI（kg/m^2）	22.21±2.98	23.98±3.19*	25.42±3.40 #	742.104	<0.001
Overweight (n(%))	921（22.0）	1293（37.0）*	853（45.8）#	234.578	<0.001
Obesity (n(%))	125（3.0）	356（10.2）*	368（19.8）#	436.237	<0.001
HR（times/min）	71.04±9.57	75.88±14.52	75.86±11.13	2.883	0.056

***** versus optimal blood pressure p<0.05.

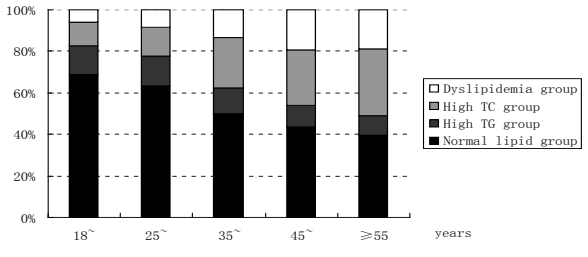
versus PHTN p<0.05.

3.3 Differences in Glucose and Lipid Metabolism, BMI, and Uric Acid by Age among Those with PHTN

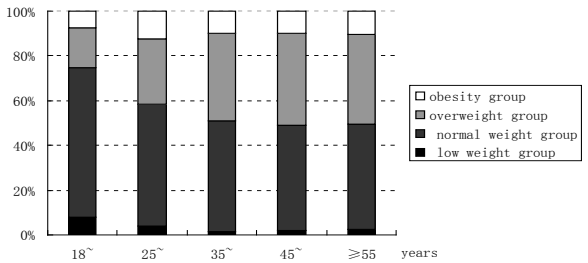
The proportion of IFG, Dyslipidemia, and overweight/obesity was increasing, while the proportion of hyperuricemia was decreasing with the increase of age among 3491 PHTN cases (all p<0.05, Figure 1).



(A)



(B)



(C)

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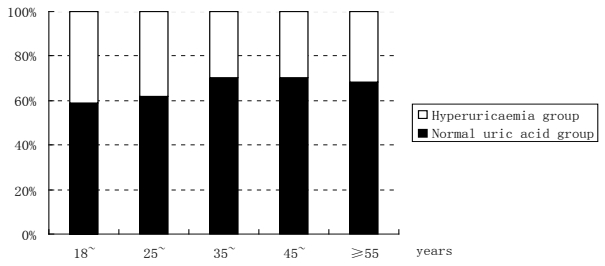

(D)

Figure 1. Differences in glucose (A) and lipid (B) metabolism, BMI (C), uric acid (D) by age among those with PHTN

3.4 Risk Factors Associated with PHTN

Multivariate logistic regression analysis showed that high BMI (overweight/obesity) was the most important risk factor for PHTN. Female gender, was a protective factor against PHTN, while age, total cholesterol , triglyceride, hyperuricemia, and heart rate were also significantly associated with PHTN.

Table 3. Univariate Analysis for Risk factors of PHTN

Items	χ^2-value	*P*-value	*OR*(95%*CI*)
Gender			
Male			1.000
Female	281.150	<0.001	0.454（0.414, 0.499）
Age（years）			
18~			1.000
≥45	165.091	<0.001	1.816（1.657, 1.989）
FBG（mmol/L）			
<6.1			1.000
≥6.1	32.292	<0.001	2.152（1.642, 2.820）
TC（mmol/L）	124.167	<0.001	
<5.18			1.000
5.18~	84.042	<0.001	1.593（1.441, 1.760）
≥6.22	69.135	<0.001	1.913（1.639, 2.233）
TG（mmol/L）	257.718	<0.001	
<1.70			1.000
1.70~	63.962	<0.001	1.749（1.524, 2.008）
≥2.26	228.834	<0.001	2.605（2.295, 2.957）
HDLC（mmol/L）			
≥0.91			1.000
<0.91	1.250	0.264	0.730（0.349, 1.525）
LDLC（mmol/L）	53.343	<0.001	
<3.37			1.000
3.37~	37.854	<0.001	1.443（1.283, 1.622）
≥4.14	21.725	<0.001	1.572（1.298, 1.903）
Hyperuicaemia			
Yes			1.000
No	127.775	<0.001	1.809（1.631, 2.006）
BMI（kg/m2）	498.696	<0.001	
18.5~			1.000
<18.5	48.634	<0.001	0.435（0.343, 0.553）
24.0~	240.526	<0.001	2.251（2.029, 2.496）
≥28.0	226.595	<0.001	4.566（3.692, 5.646）
HR	74.748	<0.001	
＜ 70			1.000
70 ～ 80	10.114	0.001	1.177（1.064, 1.301）
≥80	78.188	<0.001	1.765（1.555, 2.004）

Table 4. Multicariate logistic regression analysis for Risk factors of PHTN

Risk factors	*P*-value	*OR*	95%*CI*
Gender (men vs women)	0.0001	0.590	（0.530, 0.656）
Age (young vs middle aged)	0.0001	1.586	（1.430, 1.758）
TC	0.0034	1.201	（1.062, 1.358）
TG	0.0006	1.141	（1.058, 1.230）
Hyperuicaemia (yes vs no)	0.0002	1.259	（1.115, 1.421）
BMI	0.0001	1.844	（1.701, 2.000）
HR	0.0001	1.393	（1.302, 1.491）

3.5 Survey of Demographic Data among 733 Young and Middle-Aged Health Check-Up Cases

There were significant differences in the educational rate, marital status, and family income between different blood pressure group 733 young and middle-aged health check-up cases (all p<0.05, Table 5).

Table 5. The demographic data among 733 young and middle-aged health check-up cases

Characteristic	n	Optimal BP	PHTN	HTN	χ^2-value	*P*-value
Gender					13.974	0.001
Male	454（61.9）	170（49.9）	180（70.0）	104（77.0）		
Female	279（38.1）	171（50.1）	77（30.0）	31（23.0）		
Age group (years)					48.598	<0.001
18~	372（49.4）	210（61.6）	115（44.7）	37（27.4）		
≥45	361（50.6）	131（38.4）	142（55.3）	98（72.6）		

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Account Types					2.929	0.231
Rural household	72（9.8）	33(9.8)	21（8.3）	19(14.3)		
Towns Account	661(90.2)	308(90.2)	236(91.7)	116（85.7）		
Educational level					15.503	0.004
Less than high school	72（9.8）	29（8.4）	24（9.4）	22(16.3)		
High school degree or equivalent	458(62.5)	201(59.1)	167(65.0)	92(68.4)		
More than high school	203(27.7)	111(32.5)	66（25.6）	21(15.3)		
marital status					25.697	<0.001
single	185(25.2)	104(30.4)	65（25.2）	8（6.1）		
Married / cohabiting	542(74.0)	234(68.8)	189(73.7)	127（93.9）		
Divorced / Separated	6（0.8）	3（0.8）	3（1.1）	0（0.0）		
Occupation					9.912	0.052
Institutions	532(72.6)	233(68.3)	194(75.6)	109（80.6）		
enterprise	191(26.1)	100(29.5)	61（23.7）	26(19.4)		
other	10（1.4）	8（2.2）	2（0.8）	0（0.0）		
Family income (yuan)					18.604	0.046
<2000	3（0.4）	2（0.5）	1（0.4）	0（0.0）		
2000~	249(34.0)	102(29.8)	93（35.0）	63(46.9)		
4000~	416(56.8)	213(62.6)	141(53.0)	61(44.9)		
>6000	65（8.8）	24（7.1）	31(11.7)	11（8.2）		
Total	733（100.0）	341（100.0）	257(100.0)	135（100.0）		

3.6 Survey of Health and Physical Activity among 733 Young and Middle-Aged Health Check-Up Cases

There were significant differences in the smoking rate, passive smoking, drinking, the nature of work, the degree of physical strength between different blood pressure groups among 733 young and middle-aged health check-up cases (all $p<0.05$, Table 6).

Table 6. The health and physical activity among 733 young and middle-aged health check-up cases

Characteristic	n	Optimal BP	PHTN	HTN	χ^2-value	P-value
Smoking status					9.983	0.007
no	443（60.4）	225（65.9）	145（56.4）	69（51.0）		
yes	290（39.6）	116（34.1）	112（43.6）	66（49.0）		
Passive smoking					21.319	0.002
no	118（16.1）	71（20.9）	32（12.4）	11（8.2）		
Less than one week	360（49.1）	166（48.8）	131（51.1）	61（44.9）		
One week to one month	54(7.4)	25（7.3）	20（7.9）	8（6.1）		
More than a month	201（27.4）	79（23.0）	74（28.6）	55（40.8）		
Alcohol use					23.914	<0.001
no	432（58.9）	232（67.8）	127（49.6）	69（51.0）		
yes	301（41.1）	110（32.2）	130（50.4）	66（49.0）		
Physical activity status					7.514	0.276
Inactive	214（29.2）	97（28.5）	70（27.4）	50（36.7）		
Not regularly active	363（49.5）	165（48.5）	130（50.4）	69（51.0）		
Sometimes active	134（18.3）	69（20.1）	47（18.4）	15（11.2）		
Regularly active	22(3.0)	10（3.0）	10（3.8）	1（1.0）		
Nature of the work					25.917	<0.001
Brain-based	278（37.9）	161（47.2）	84（32.7）	33（24.4）		
Mainly physical	455（62.1）	180（52.8）	173（67.3）	102(75.6)		
Intensity of work					6.591	0.360
Relaxed	11(1.5)	6（1.9）	2（0.8）	3（2.0）		
general	480（65.5）	212（62.3）	176（68.4）	94（69.4）		
tension	191（26.1）	99（28.7）	64（24.8）	26（19.4）		
Toil	51(7.0)	24（7.0）	15（6.0）	112(9.2)		
Physical extent					24.916	<0.001
light	94（12.8）	62（18.2）	25（9.4）	2（2.0）		
Moderate	502（68.5）	212（62.1）	188（73.3）	108(79.6)		
weight	137（18.7）	67（19.8）	44（17.3）	25（18.4）		
Sit time (hours)					6.143	0.407
<2	93(12.7)	37（10.8）	40（15.4）	17（12.2）		
2~	174（23.7）	88（25.7）	60（23.3）	23（17.3）		
4~	131（17.9）	61（17.9）	42（16.5）	29（21.4）		
>6	335（45.7）	155（45.5）	115（44.7）	66（49.0）		
Total	733（100.0）	341（100.0）	257（100.0）	135（100.0）		

3.7 Survey of Nutrients, Minerals and Vitamin Intake among 733 Young and Middle-Aged Health Check-Up Cases

Compared to the recommended value by Chinese residents balanced diet pagoda, the intake of meat, grains, and soy among 257 young and middle-aged PHTN cases were lightly more than the recommended value. The intake of dietary energy, dietary protein, fat, and carbohydrates was higher than the recommended values. Dietary phosphorus, potassium, sodium, zinc, copper, and manganese exceeded the recommended values. Vitamin A intake was lower than the dietary reference intakes (Table 7).

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Table 7. The Intake of Nutrients, Minerals and Vitamin among 733 Young and Middle-Aged Health Check-Up Cases

Dietary components	Optimal BP（n=341）	PHTN（n=257）	HTN（n=135）	*P*-value	RNIs/AIs
Nutrients					
Energy (kcal)	2438.7±773.8	2620.7±864.9*	2850.9±871.4	<0.001	2200
Carbohydrate (g)	352.1±150.5	382.6±163.0*	414.1±158.0	0.001	230~373
Protein (g)	112.3±40.5	102.0±49.2	97.1±44.9	0.013	66.9~99.8
Fat (g)	83.5±26.8	88.0±32.2	96.8±36.9 #	<0.001	56.9~78.3
cholesterol (g)	393.8±44.9	398.4±49.3	405.1±50.6	0.091	300~500
Fiber (g)	18.8±9.36	17.0±10.7	16.3±13.7	0.183	19.2~32.4
Carbohydrate (%)	56.74	57.39	57.32	0.722	
Protein (%)	15.66	15.32	15.65	0.535	
Fat (%)	31.69	31.08	31.27	0.656	
Minerals					
Calcium (g)	350.4±232.0	352.2±240.8	323.3±128.5	0.526	950.00
phosphorus (g)	929.4±327.4	989.4±326.6*	1022.0±316.4	0.013	702.50
Potassium (g)	2289.8±862.4	2468.1±994.5*	2675.4±892.9	<0.001	2000.0
Sodium (g)	1727.3±402.9	1769.7±345.4	1920.6±1275.2 #	0.015	1400.0
Magnesium (g)	321.6±95.2	301.5±105.4*	279.1±101.9	<0.001	322.50
iron (g)	12.9±5.8	12.5±7.1	11.9±6.7	0.279	13.00
zinc (g)	12.1±3.5	11.4±3.5*	10.4±3.8	<0.001	10.00
Selenium (g)	47.1±15.2	44.8±14.9*	41.1±16.1	<0.001	60.00
copper (g)	1.4±0.4	1.3±0.5*	1.1±0.5	<0.001	0.80
manganese (g)	5.4±1.9	5.2±1.8*	4.7±2.0	<0.001	4.50
Vitamin					
Vitamin A (μg, RE)	445.5±209.3	436.1±258.5	410.0±232.3	0.256	750.0
Vitamin E (mgα-RE)	13.3±11.3	13.4±4.9	13.7±3.7	0.882	14.00
Vitamin B1 (mg)	1.8±1.4	1.6±1.5*	1.3±2.0	0.006	1.30
Vitamin B2 (mg)	1.9±1.4	1.6±1.6*	1.3±1.4	0.003	1.30
Vitamin C (mg)	159.9±82.5	132.0±68.0*	122.3±75.9	0.019	100.0
niacin (mg)	9.1±10.3	7.0±8.5*	5.8±13.6 #	0.037	12.63

3.8 Dietary Pattern

It was presented that dietary patterns included “meat model”, “spice model”, “main vegeTables model” and “high protein model”.

Table 8. Rotated factor loading matrix

Items	factor 1	factor 2	factor 3	factor 4
Red meat	**0.71412**	0.24892	-0.01790	-0.10514
Plain boiled pork	**0.78560**	-0.03228	0.21550	-0.15544
oil	-0.20204	**0.64515**	-0.24710	0.03450
salt	0.08078	**0.72507**	-0.40996	0.07782
Sauce	-0.14635	**0.45135**	-0.15196	-0.06564
Meter	0.51350	-0.12688	**0.50277**	0.12276
surface	0.11389	-0.18066	**0.65901**	-0.00355
Other cereals	-0.07827	-0.09941	**0.54423**	0.03498
beans	-0.05615	-0.05798	-0.16311	0.35117
egg	0.16719	0.13672	0.01183	**0.50683**
milk	-0.10166	-0.01491	0.16137	**0.71506**
fruit	-0.15434	0.10916	-0.04551	**0.62409**
Fish and shrimp	0.17111	0.51432	0.04498	0.15538
vegeTables	0.43250	0.40162	-0.00272	-0.03967
Chicken	0.35030	-0.02455	0.48402	-0.03390
soy sauce	0.00240	0.00635	-0.01757	0.01450

3.9 Risk Factors Associated with PHTN Among 733 Young and Middle- Aged Health Check-Up Cases

Multicariate logistic regression analysis among 733 young and middle-aged health check-up cases revealed that age, drinking increased the risk of PHTN. But dietary milk intake and dietary magnesium intake were negative influencing factors for PHTN.

Table 9. Univariate Analysis of Risk Factors of PHTN

Items	χ^2-value	*P*-value	*OR*	95%*CI*
General status				
Gender	22.085	<0.001	0.450	（0.322, 0.629）
Age	13.213	<0.001	1.838	（1.322, 2.556）
Account Types	0.526	0.468	1.234	（0.699, 2.179）
Educational level	15.503	0.004	0.710	（0.381, 1.323）
Marital status	1.864	0.172	1.287	（0.895, 1.851）
Occupation	2.787	0.095	0.730	（0.504, 1.057）
Family income	3.065	0.080	0.729	（0.511, 1.039）
Smoking status	5.571	0.018	1.493	（1.070, 1.039）
Passive smoking	7.912	0.005	2.113	（1.250, 3.571）
Alcohol use	19.829	<0.001	2.128	（1.523, 2.973）
Physical activity status	0.043	0.835	0.950	（0.587, 1.538）
Nature of the work	4.164	0.041	1.579	（1.016, 2.454）
Intensity of work	1.334	0.248	0.803	（0.553, 1.166）
Physical extent	24.916	<0.001	2.313	（1.392, 3.842）
Sit time	2.040	0.153	0.648	（0.356, 1.177）
Food type				
Grain	15.692	0.001	1.002	（1.001, 1.003）
Peas and beans	0.141	0.707	0.999	（0.994, 1.004）
Livestock meat	6.231	0.013	1.003	（1.001, 1.006）

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Fish and shrimp	0.022	0.881	1.000	（0.996, 1.003）
Eggs	2.063	0.151	0.999	（0.998, 1.000）
Dairy products	4.724	0.030	0.995	（0.993, 0.997）
VegeTables	2.198	0.138	1.000	（1.000, 1.000）
Fruits	1.630	0.202	0.999	（0.996, 1.001）
Fats and oils	1.635	0.201	1.009	（0.995, 1.023）
Salt	0.083	0.774	1.007	（0.960, 1.056）
Nutrients				
Energy	7.567	0.006	1.003	（1.001, 1.006）
Protein	1.726	0.189	0.088	（0.762, 1.012）
Fat	3.577	0.059	1.005	（1.002, 1.008）
Carbohydrate	5.812	0.016	1.003	（1.001, 1.005）
Cholesterol	1.513	0.219	1.002	（0.999, 1.005）
Fiber	0.515	0.473	1.005	（0.992, 1.017）
Minerals				
Calcium	0.009	0.926	1.000	（0.999, 1.001）
Phosphorus	5.018	0.025	1.002	（1.001, 1.003）
Potassium	5.625	0.018	1.004	（1.002, 1.006）
Sodium	2.387	0.122	1.000	（1.000, 1.001）
Magnesium	6.979	0.008	0.881	（0.752, 0.998）
Iron	1.257	0.262	0.996	（0.990, 1.002）
Zinc	9.978	0.042	0.916	（0.860, 0.976）
Selenium	8.169	0.044	0.920	（0.854, 0.990）
Copper	6.938	0.048	0.932	（0.880, 0.999）
Manganese	9.839	0.042	0.916	（0.832, 0.996）
Vitamin				
Vitamin A	1.749	0.186	0.930	（0.840, 1.051）
Vitamin E	0.052	0.820	1.000	（1.000, 1.000）
Vitamin B1	4.858	0.028	0.910	（0.822, 0.988）
Vitamin B2	4.750	0.029	0.910	（0.800, 0.990）
Vitamin C	1.692	0.193	1.000	（1.000, 1.001）
Niacin	2.174	0.140	0.920	（0.996, 1.025）
Dietary status				
Meat model	0.452	0.500	0.952	（0.802, 1.111）
Spice model	5.678	0.021	1.210	（1.032, 1.413）
Main vegeTables model	0.979	0.332	0.923	（0.790, 1.008）
High protein model	0.218	0.655	0.968	（0.820, 1.113）

Table 10. Multicariate Logistic Regression Analysis for Risk Factors of PHTN

Risk factors	*P*-value	*OR*	95%*CI*
age	0.0009	2.201	（1.379, 3.511）
Drinking	0.0006	1.982	（1.342, 2.927）
Milk and dairy products	0.0421	0.986	（0.950, 0.991）
magnesium	0.0427	0.978	（0.964, 0.992）

4. Discussion

In this study, we found that the prevalence of PHTN in Guangzhou, Guangdong Province, an economically developed district of southern China, was up to 36.6%. Many epidemiological studies have demonstrated that PHTN is an important public health problem. At the beginning of this century (2000–2001), a cross-sectional survey found that the prevalence of PHTN was 21.9% among Chinese participants aged between 35 and 74 years[4]. However, in other subsequent studies, the prevalence of PHTN was significantly higher than this ratio. In rural northeastern China, the prevalence of PHTN was 35.1% in men and 32.5% in women [16], and up to 40% in the whole population from urban areas of northeastern China [17], which may be associated with the cold climate and high sodium diet. The current study revealed that the overall prevalence of prehypertension in Guangzhou province was very similar to that in the urban areas of northeastern China [18], and significantly higher than that reported at the beginning of this century for the entire country [4]. The prevalence of PHTN in different countries and districts differs significantly and may be influenced by different factors. Logistic regression analysis revealed that dietary milk intake and dietary magnesium intake were negative influencing factors, while age, drinking, TC, TG, UA, BMI and HR increased the risk of PHTN.

In this study, the risk of prehypertension was about 1.8 times higher among subjects in the middle-aged group compared to the young-aged. We also analyzed that female was a protective factor for PHTN, and the prevalence of PHTN in men was stable with age, which suggested that men may be more easily prone to progress into frank HTN than women.

Further analysis showed that increased BMI was the most important risk factor for PHTN in our study. Therefore, our study suggests that although sodium intake is relatively low in the Guangdong Province in southern China [18], the prevalence of PHTN is almost as high as that in the northern area. With economic development and lifestyle changes, obesity/overweight has become a very important risk factor for increased BP. Many studies have documented that overweight/obesity can cause significant insulin resistance, which may play an important role in impaired glucose metabolism, dyslipidemia, and increased BP [19,20]. Meanwhile, clinical studies have shown that weight control can significantly lower BP [21]. These results indicated that lifestyle modifications, such as weight loss, may be effective in the long-term primary prevention of HTN.

In addition to the traditional risk factors, the results

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indicate that the effect of UA on BP may be increased throughout the entire PHTN range. Previous studies and our team have found that serum UA levels were significantly associated with PHTN [22,23]. UA can cause a proliferation of vascular smooth muscle cells and renal microvascular damage because of local inflammation and oxidative stress, finally leading to high BP [24,25]. Therefore, the mechanisms may be associated with inhibition of the nitric oxide pathway and activation of the renin-angiotensin system. And it needs to be investigated further. Besides, In this study, we also found that the proportion of hyperuricemia was decreasing with the increase of age among PHTN cases. It suggested that serum UA levels may be an important risk factor for young people. Previous findings strongly supported the synergistic pathogenic role of UA and obesity in HTN, which indicated diet is an important factor affecting the levels of UA[26]. Therefore, we emphasize the importance of lifestyle modification interventions for people with PHTN.

We explored that increasing the intake of dietary milk intake and dietary magnesium was the protective factor for PHTN through questionnaires. Dairy foods were rich in calcium. Currently, the impact of dietary calcium on blood pressure remains controversial. But the public generally considered that the level of calcium and blood pressure were negatively correlated, and increased dietary calcium can be effective in preventing blood pressure [27-29]. Magnesium may be used as calcium channel blockers to decrease the level of blood pressure. Chidambaram [30] found that the level of blood pressure that intake the lower magnesium intake was higher than those who intake the higher magnesium among the Indian inhabitants. A prospective cohort study showed that after 7.6 years of follow-up investigation and adjusting other factors, the risk of HTN and urinary magnesium was negatively correlated [31]. As for other influencing factors, it is consistent with other studies.

However, evidence for the treatment of prehypertension are still lacking, while lifestyle modifications remain the most important measure. At present, there are few kinds of researches on the influence of diet on blood pressure, and the current study is just to prove that lifestyle, especially diet, is closely related to the occurrence of prehypertension. Based on the results from the study, that alcohol intake, intake of dairy products, and intake of magnesium changes in intake of these products may be able to intervene in the development of HTN. However, the present study cannot provide reasonable dietary recommendations for the prehypertensive population. Further studies are needed to understand the underlying causes of the trends.

5. Limitations and Prospects

The present study has several methodological limitations. First, our data were based on community-based health check-up information, and not from a multistage stratified clustering sample. This may cause a bias in the prevalence of PHTN. Second, the determination of blood pressure was based on one-day measurement, which may result in misleading classifications of PHTN. But the blood pressure of 733 cases was accurately measured. Third, as the investigation time is short, food choices and the bias of memories contributed to the limitation of the findings oft the relationship of food consumption and PHTN. Our research team will conduct further study on interventions PHTN and pay attention to the above limitations.

6. Conclusion

This study showed that along with the economic development and lifestyle changes, PHTN was highly prevalent in Guangzhou. Our findings highlight there was an urgent need to educate both patients and health care providers of the importance of achieving the target of treatment in order to reduce morbidity and mortality due to PHTN and HTN.

Education about effective lifestyle modifications as an alcohol limit, increasing the intake of dairy products and magnesium can intervene in the development of PHTN, which would be of great benefit in controlling high blood pressure and preventing its complications. But how to develop targeted interventions for such groups need to be further explored. The present study also lays the theoretical foundation and basic data for the next step.

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Conflict of interest

The authors declare no conflict of interest.

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Probe into Reverse Operation of Apoptosis Gene

Zhongliang Wang*

Shaanxi Medical School, Xi' an, Shaanxi, 710000, China

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ABSTRACT

Objective: The programmed death process of cells according to gene coding belongs to apoptotic natural extinction (PCD). The purpose of this study is to explore the phenomenon of "returning to old age and rejuvenating children" in the extreme anoxia, no nutrients and survival in the extreme environment of fish and earthworm. **Methods:** the adult earthworms were put into the sealed quartz sand or fine yellow sand plastic bottle with humidity of 35-40%70 ml and poured out 100-150 d, then put back into the natural environment (simulated natural plastic basin) and raised 100-150 d, to collect the experimental information. The same object can be observed repeatedly. **Results:** The earthworms which were closed in the little oxygen-free and nutrition-deficient vials were reduced by autophagy, and the rings and reproductive pores disappeared completely. When they were put back into the natural environment for two or three months, they were all restored to their original morphological structure. **Conclusion:** Most of the same subjects underwent 1-3 years of cyclic observation. The biological structure was adapted to the changing environment. It was helped by the resonance of many biota and complex stress factors.

1. Experimental Research

Information indicates that earthworms live for one year[1]. In order to confirm that a earthworm in the continuous circulation of 2012.4.30-2015.5.1 was kept in an "ecological basin" (a large plastic box), a total of 10 F of the same size were excavated$_1$Cercaria age, especially put into the ecological basin feeding. Only P generation of 3 and 5 F will be left until April 17,2016.26.17$_2$Children. The claim that earthworms live one year is verified. Experimental study of earthworm life cycle is shown in table 1.

2. Analysis and Discussion of Experimental Results

2.1 Analysis of Experimental Results

Through the above table information, we can see that most of the experimental subjects disappeared 36 months ago in the cycle time of the two habitats, and only a few individuals survived each cycle. Essential apoptotic genes result from the accumulation of genetic mutations and DNA replication errors during the rounds of cycling, mutual symbiosis, parasitism and microorganism species in the digestive tract of earthworm[2], the resonance frequency of the population community and the difference of metabolic factors. Analysis of major causes of death from tissue-cell level, hypoxia-inducible factor-1(hypoxia-inducible factor 1HIF-1)[3]decompensation function. The cell carries on the compensatory anaerobic respiration; the tissue cell autophagy, the anaerobic metabolism produces a large number of toxic substances, the PH drops rapidly causes the internal environment to be extremely disordered bcl-2(the inhibition apoptotic protein reduces), the

**Corresponding Author:*
Zhongliang Wang,
Shaanxi Medical School, Xi' an, Shaanxi, 710000, China;
E-mail: abc495281@126-com.

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Table 1. Experimental study of earthworm life cycle

Experimental time	Experimental Methods	Information extraction
h November.1.15	Field D20cmR2.5cm belt, bottle	
h 2018.3.1.9	Open the seal bottle	Two all in, life as before, D slightly reduced R reduced to 0.2 cm ring belt still left traces immediately put into plastic bottles.
h 2018.6.6.9	Open plastic bottles	The length of both reduced to 0.15 cm R. Immediately put into the "ecological basin ".
h 21.13.21	Digging ecological basins	If one disappeared, the other life recovered as DR first time, but the ring belt, reproductive hole did not regenerate. Immediately into the "ecological basin ".
h 2019.8.7.9.30	Digging ecological basins	Ring belt, reproductive hole milky white visible.
h 10.12	Wild take D20cmR2.5cm5 adult ,350 ML glass bottle three ,70 ML plastic bottle two.	
2019.2.15.15.33 h	Unsealing two devices	A large glass bottle disappeared two alive, plastic bottle saw two and long 2 cm fragments, different from the former is the ring basically disappeared. Because the DR and ring belt change little, immediately into the original environment.
20.19.4.27.10.30 h	Unsealing two devices	Plastic bottle two life such as initial DR sharp reduction R shrink to 0.1 cm, ring belt, reproductive hole completely disappeared. Put into the ecological basin 11 h on the same day. Large glass bottle only one form and plastic bottles are also put into the ecological basin.
h 2019.8.14.9	Digging ecological basins	A living D25cm, R0.25cm, ring belt, reproductive hole visible. Another developed apologetic D10cm, R0.15cm, ring band is obvious, reproductive hole is shallow.
2020.1.19.11.53 h	Natural selection of 5 adults D20-25cmR0.25cm 100 ml glass bottles 2 70 ml plastic bottles 3 each put 1 seal	
2020.5.16.12 h	Unsealing device	One of the glass bottles survived, and the ring band disappeared into the reproductive hole. Plastic bottles of 2 survivors DR were significantly reduced D5cm,R0.1cm. ring, reproductive holes disappeared. Immediately put three more into the ecological basin.
2020.8.16.8.20 h	Digging ecological basins	Only one is alive, the D15cm,R25cm, ring belt is not completely disappeared, the reproductive hole is shallow.

Most earthworm adults with fertility have ring bands and reproductive pores. Experimental sealing device, the experimental object after filling sand, solid, cover plastic film, tighten the cap coated with paraffin, placed indoors. The ecological basin is placed on the balcony. The D represents body length and R represents thickness.

ba ×(promotes the apoptotic protein increase)[4]Apoptotic genes accelerated along the DNA coding program. All organelles have changed their structure and lost their original function. The release of lysosomal enzymes due to lysosomal rupture leads to the death of lysosomal individuals. Mud bodies were common during the experiment.

2.2 The Production of Stress-Reverse Regulatory

The production of stress-reverse regulatory proteins drives the reverse movement of apoptotic genes: when oxygen in the sealing device is depleted by consumer metabolism, HIF-1 almost lost his function, Many microbial metabolic factors in the intestinal cavity of earthworms, Into the nucleus of the tissue through multiple channels, the excitation induces mutations in introns (invalid segments on the DNA chain) into exons (valid segments on the DNA chain); That is, invalid genes are mutated into effective genes (stress steering regulatory genes). the gene is rapidly transcribed into mRNA ► ribosomes ► translated into stress-steering regulatory proteins (YJZXT-Pr). Crook first discovered the apoptosis inhibitor protein IAP, from baculovirus Involved in this stress response, Also included I HIF-1, P16 a negative cell cycle regulator[5]At present ,8 anti-apoptotic factors have been found. Apoptosis suppressor gene (Ced) inhibits the issuance of apoptosis signal, closes the outer pore of mitochondria, and prevents the emergence of apoptosis factors such as cytochrome C, Smac. [6]. The whole process of the reverse operation of apoptotic genes, the comprehensive regulatory factors such as cytokines, some RNA or even some inorganic mineral element ions, are also actively involved in the mediation of the reverse operation of apoptotic genes.

At present, scientists know the trajectory of apoptotic genes. However, the reverse operation of apoptotic genes is rare. From the logic, dialectic principle, the whole nature has contradictions and opposites of unity principles; for example: up and down, high and low, before and af-

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ter, left and right, north and south, black and white, size, and so on! Since the apoptotic gene can run forward, it must also retreat retrograde. Then the reverse operation of apoptotic gene is also a protective reaction, and the instinct of seeking advantages and avoiding disadvantages belongs to biological instinct. We are common in life, in aviation, earthquake and other major disasters can survive by chance are often young children, because young children have strong vitality, high adaptability. This is also the result of natural selection. As shown below:

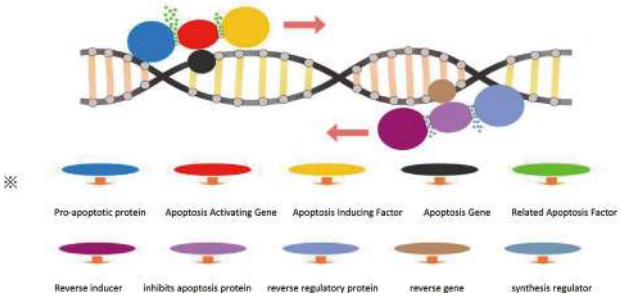

Figure 1. Result of natural selection

Why is the first signal to retrograde apoptotic genes derived from the metabolism or secretion of community organisms in the digestive tract of earthworms? Because when earthworms are sealed to "cut off food ", stop oxygen, at this time earthworms can not absorb the biological decomposition products from the intestinal cavity for the worm, can only rely on autophagy to maintain life. At this time, the product of the metabolic resonance with the host under the living conditions of parasitic and symbiotic organisms should be the comprehensive factor of the reverse operation of apoptosis. Because only the host "rejuvenation" they retain a limited living environment, in which the community organisms wait for the afterlife in the form of dormancy. This kind of special energy is also the result of long-term mutual adaptation and natural selection evolution.

2.3 Evidence of Reverse Movement of Apoptotic Genes

(a) earthworms

(b) the 2-3 month adult

(c) the 3-5 adult

(d) 3-5 month adult

Figure 2. Reverse Movement of Apoptotic Genes

Figure 2(a) is a worm that seals the worm after 3-4 or 5 months. Individuals are 3-7 times smaller than adult D, R reduced 2-3 times. ring band, reproductive pore completely disappeared. Figure 2(b) spent 2-3 months digging out an ecosystem, At 1.2 cm in front of the head, reproductive foramen is still not fully recovered. Figure 2(c) a well - developed adult, A large cylinder at the rear end of the head is its ring band. Figure 2(d) lower part of the map is inverted U the right corner of a small depression for reproductive holes.

Genes determine traits. The structure of the ring and reproductive pores of earthworms is controlled by the related structural genes. This structure under special environmental conditions, the regulation of various metabolic factors, apoptosis gene reverse operation, resulting in the loss of these structures, and when the living environment changed to the original natural conditions, Under the regulation of various genetic substances and metabolic factors, the original structure was restored and developed again.

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3. Conclusions and Prospects

3.1 Conclusions

Once nutrients and air are cut off, earthworms quickly stress HIF-1 and, in collaboration with biological stress metabolic factors in the gut community, induce DNA introns-invalid genes to mutate into exons-effective reverse apoptosis regulatory genes, guide transcription into reverse response regulatory proteins, and promote the conversion of certain nucleic acid fragments, amino acids and their derivatives, or even some inorganic elements in tissue cells.

3.2 Prospect

Based on the theory of disturbance effects of animals, cave organisms, frozen cold, drought, high temperature and other environments have evolved corresponding instinct —— dormancy. Cell metabolism is very slow. There is a species of Cam bandue living in the U.S .(Alabama) Shenta Cave (Shelta cava) that can still produce children at the age of 100 and has a life span of 175[7] Li Qingyuan, a traditional Chinese medicine scholar in the late Qing Dynasty and early Republic of China, lived 256 years. In the Ming Dynasty, there was a monk in Sichuan who lived more than 300 years and was received three times by Emperor Zhu Di. Chen Jun was born in 881 and died in 1324 at the age of 443. After four dynasties, his body shrank back into a baby at the age of 400[8] People who have suffered in their daily lives, or who have suffered from a chronic disease for many years, can live to be 100 years old. According to the principle of cytogenetics, the limit of human life is 5-7 times that of ontogeny (25 years old), that is ,125-175 years old. The general explanation is that Li Qingyuan introduced that he likes to drink Lycium barbarum tea for a long time; the senior monk is obviously due to the lack of desire, fresh air in the residence, meditation with luck, and maintaining a good state of mind. That Li Jun phenomenon can only be explained by the reverse operation of the apoptotic gene. There are also examples of scholars: in the environment with low level of economic development, people often live with slower apoptotic genes and longer life span[9] .Its essence should be caused by the interruption and reverse operation of apoptosis genes in important organs and tissues of human life. In addition, there are often news reports that people at home and abroad suffer from terminal illness, not to see a doctor but to sell property, couples driving around the world. A few years later, when he got home and went to the hospital, the miracle occurred, and all clinical symptoms disappeared. Who can say that it is not the reverse application of apoptotic genes!

In recent years, there have been a lot of media talk; because of the progress of life science, human beings can live forever in the future! Human tissue and organ factories can be established through molecular biology, genetic engineering, protein engineering, cell engineering principles and so on. Later, with age changes, parts can be replaced at any time (tissues and organs). Think that's still the modern concept of longevity? I think the desire for human health and longevity should learn from the top three ancient people. With the progress of science and technology, scientists will one day study the law of reverse operation of apoptotic genes and the regulation of drugs and comprehensive regulatory factors, with the aim of actively changing the trajectory of apoptotic genes. Control and change the metabolic characteristics of human physiology to keep youth alive.

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Comprehensive Analysis, Discussion and Suggestion on the Current Situation of Cardiopulmonary Resuscitation and Automatic External Defibrillator in General Public in China

Yuheng Jiang* **Chenxu Yang** **Xuchen Deng** **Zhilu Li** **Saijia Li**

Hainan Medical University, Haikou, Hainan, 570100, China

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ABSTRACT

The number of sudden cardiac death (SCD) has increased year by year, which has become one of the main causes of death in China. Timely cardiopulmonary resuscitation (CPR) and timely and accurate use of automatic external defibrillator (AED) can greatly improve the survival rate of patients with sudden cardiac death. Because the large probability of sudden cardiac death occurs outside the hospital, it is very important for the general public to master first aid skills. This paper will mine all kinds of data from multi-dimensional and multi-angle, analyze the mastery of public first aid skills in China, and provide practical suggestions and ideas for popularizing first aid skills in the future.

1. Background

Cardiac sudden death refers to sudden death caused by various abnormal conditions of the heart. The clinical symptoms are cardiac arrest and other manifestations [1]. In 2020, the American Heart Association proposed that cardiopulmonary resuscitation and automatic extracorporeal defibrillator should be placed in the survival chain of cardiac arrest. After cardiac arrest, the survival rate closely related to the timeliness and effectiveness of emergency response[2] . The survival rate min 7%-10% per delay[3] . However, many cardiac arrest occurs outside the hospital, and it is difficult for professional emergency personnel to arrive at the scene in time to carry out rescue [4]. Therefore, it is very important for the general public to master the use of cardiopulmonary resuscitation and automatic external defibrillator.

According to statistics, 544000 people die of sudden cardiac death every year in China. With the development of historical process[5], China is gradually stepping into the of aging society[6]. At the same time, the number of sudden cardiac death may increase gradually due to the influence of various reasons, such as the general increase of life pressure of cardiovascular diseases[7]. Therefore, it is urgent to understand the public's grasp of CPR and AED and to popularize it. The purpose of this paper is to systematically summarize and analyze the current situation of cardiopulmonary resuscitation and automatic external

**Corresponding Author:*
Yuheng Jiang,
Male, undergraduate,
Hainan Medical University, Haikou, Hainan, 570100, China;
E-mail: 1256996541@qq.com.

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defibrillator in China, so as to provide reference for later related research, first aid knowledge popularization and policy formulation.

2. Availability

Through the summary and analysis of the survey data from all over China, it is found that Guo Panfeng and others have mastered the knowledge and skills of public first aid (the use of CPR and AED, the same below) in a park in Huaian City. The average score was 21.7(100),16.5 and 7.4[8].

According to the survey results in Chengde City, the people are still unfamiliar with the knowledge and operation of first aid. At the same time, only 7.88% of the people in the face of cardiac arrest have confidence in the implementation of cardiopulmonary resuscitation [9]. According to the investigation of a university in Wuhan with high knowledge level, only 25.9% of the students understand the cardiopulmonary resuscitation process [10]. According to the sample survey results of Jiang Yan and others on a street in Shenyang Public Peace Zone, even medical workers still do not fully popularize the relevant knowledge used by AED, and there are certain knowledge defects[11].

The overall grasp of CPR and AED use in China is not very optimistic, the master rate of cardiopulmonary resuscitation in more developed areas is about 4, and that in less developed areas is less than 1%[12]. Compared with these indicators abroad, it is found that the popularization rate of basic first aid technology of ordinary people in advanced countries abroad can reach 90[13], and the difference between the two is great. On the aspect of sudden cardiac death outside hospital, according to some domestic statistics, the survival rate of out-of-hospital SCD in China is less than 1 and that of foreign advanced countries can reach 10-30[14]. This also reflects the gap between the public's knowledge of first aid and the use of CPR and AED.

3. Analysis, Discussion and Recommendations

China is affected by many factors, such as history, geography, policy and so on, and the development situation of different regions is different. However, from the above survey results, the public's knowledge of first aid theory and the mastery of first aid skills are not satisfactory. Although the rate of cardiopulmonary resuscitation in more developed areas of China is higher than that in less developed areas, it is necessary to continue to strengthen the popularization of public first aid skills in order to reach the advanced level abroad. In accordance with the existing national conditions of our country, we should first carry out cardiopulmonary resuscitation and automatic external defibrillator training for staff in crowded places such as stations, shopping malls, communities and schools, so as to maximize the benefits of training. The next step is to spread out and popularize first aid knowledge for all the public. In addition, it is necessary to make good use of social media, short video platforms and other popular ways to promote and explain, but also to explore a new mode of first aid on the Internet, that is, to learn the theoretical knowledge and operational methods of first aid skills on the Internet, and to open related venues to allow the public to conduct on-the-spot operation exercises by way of appointment, which is in line with the characteristics of the current professional first aid knowledge popularization, the large number of Internet users and the fragmentation of public time. In addition, the first aid knowledge popularization activities for college students should also be paid attention to. College students have little pressure of life, rich spare time and high physical condition, which is suitable for learning and mastering relevant first aid knowledge. According to the outline of the National Medium- and Long-term Education Reform and Development Plan (2010-2020) promulgated and implemented by the State Council, the total scale of higher education inby 2020 will reach 35.5 million people [15] . According to the plan, college students will soon become the main force of various industries in our country. The college students who have received first aid knowledge training have entered different jobs to play the role of pre-hospital first aid, thus avoiding the uneven distribution of trained personnel. Moreover, a survey of a university in Xi'an shows that more than 99% of college students think they should master CPR skills, of which 92.30% are willing to participate in training [16]. Therefore, the popularization of first aid knowledge for college students has the advantages of strong feasibility, high enthusiasm of the audience, good effect and wide coverage.

To increase public use of CPR and AED, AED delivery should also be increased. Because AED are expensive, the average family can't afford it, besides social donation, it mainly depends on government [17]. Based on available data, On average, per 100,000 people, The United States has 700 AED[18-19], Japan has 276[18,20], Singapore 35[21], And in some of our big cities with statistics, For every 100,000 people, Shenzhen 17.5, Haikou 13[22], Shanghai Pudong 11, Hangzhou 5[17]. As you can see, China's current AED delivery is relatively inadequate, the gap with developed countries is large. Government should continue to increase AED delivery, but we should also make a reasonable plan of the location before the launch, avoid the

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of unreasonable distribution in some areas. Besides relying on the government, all residents of the district or street purchase and install, is also a viable option, this requires the organization and guidance of community and property managers, and the cooperation of local residents.

4.Conclusion

By the end of this year, China will build a well-off society in an all-round way, and the popularization of first aid knowledge should be accompanied by economic development. Synthesizing the existing data, the mastery of CPR and AED use in China still needs to be improved. According to the actual situation, the next step should be to popularize the knowledge of first aid to the public, especially the college students, and at the same time, we should take reasonable measures to increase the quantity of AED delivery to ensure the smooth progress of first aid.

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Evaluation of Light Specific Gravity Ropivacaine Combined with Sufentanil in Hip Arthroplasty at An Advanced Age

Daxu Peng[1,2*] Qingchen Liu[3] Xiuyang Cao[2] Guanwen Deng[1]

1.Shaoguan Shaokang Hospital, Shaoguan, Guangdong, 512400, China
2.Affiliated Hospital of North China University of Technology, Tangshan, Heibei, 063000, China
3.Lechang Traditional Chinese Medicine Hospital, Shaoguan, Guangdong, 512400, China

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ABSTRACT

Objective: To observe the effect of light specific gravity ropivacaine combined with sufentanil in elderly patients undergoing hip replacement. **Methods:** 89 elderly patients with hip arthroplasty from July 2019 to September 2020 were randomly divided into experimental group and control group. The experimental group was anesthetized with light specific gravity ropivacaine combined with sufentanil. The control group was anesthetized with equal specific gravity ropivacaine to compare the effect of anesthesia and the incidence of adverse reactions. **Results:** there was no significant difference in sensory recovery time and motor recovery time between the experimental group and the control group (P>0.05), and the incidence of adverse reactions between the two groups was low. The sensory block time in the experimental group was shorter than that in the control group (PP>0.05). **Conclusion:** ropivacaine combined with sufentanil subarachnoid anesthesia is more effective in elderly patients undergoing hip arthroplasty, and the safety of the anesthesia scheme is higher, which will not lead to serious adverse reactions during operation. Moreover, the application of the anesthesia scheme can effectively improve the analgesic effect during and after operation, and the clinical application value is high.

1. Introduction

With the increase of age, the body function of the elderly gradually decreased, bone mineral density and bone mass decreased significantly when they were younger, and the probability of orthopedic diseases was very high. Clinically, surgery is a common treatment method for patients with complex orthopedic diseases. The reduction and fixation of broken bones by surgical incision is helpful to relieve pain symptoms and reduce the occurrence of complications. It is of great significance to improve the quality of life of orthopedic patients. Hip replacement is a common operation in orthopedic field. Hip replacement is often needed in elderly patients with femoral neck fracture. In the course of surgical treatment, high quality anesthesia is essential, but anesthesia may lead to hemodynamic fluctuations and anesthetic risks, so safe and effective anesthesia is essential. Therefore, this paper studies the clinical anesthesia of elderly patients with hip arthroplasty, and compares the effect of different anesthesia schemes.

**Corresponding Author:*
Peng Daxu,
Male, master degree, attending physician,
Shaoguan Shaokang Hospital and Affiliated Hospital of North China University of Technology;
Research direction: clinical anesthesia
E-mail: 1028852891@qq.com.

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2. Information and Methodology

2.1 General Information

This study has been submitted to the ethics committee of our hospital and approved, The 89 elderly patients who underwent hip arthroplasty in our hospital from July 2019 to September 2020 were randomly divided into experimental group (n=45 cases) and control group (n=44 cases) by drawing lots, All subjects were not treated with analgesic drugs within 3 d before the start of the study, And sign informed consent, excluding those with combined cognitive dysfunction. In the experimental group, 23 males and 22 females; Age range 68-79, median age (73.24±2.67) years, Among them ,11 patients with hypertension and 13 patients with diabetes. In the control group, 22 males and 22 females; Age range 67-79, median age (73.37±2.66) years, Among them, 9 patients with hypertension and 12 patients with diabetes. General data of sex and age of experimental group and control group were verified by statistical software P>0.05, Comparable.

2.2 Method

2.2.1 Drugs

Ropivacaine: Shijiazhuang four Medicines Co., Ltd.,100 mg. H20203107, specifications

Sufentanil: Yichang Renfu Pharmaceutical Co., Ltd. Production, H20054171, specifications 50μg.

2.2.2 Anesthesia Process

Both groups were given routine perioperative nursing, preoperative examination and routine monitoring of vital signs after entering the operating room. The L3-4 of healthy lateral position or L2-3 spinous process space was selected as the puncture point during anesthesia, and the corresponding anesthetic drugs were injected according to the difference of patient group after the successful combination of lumbar and hard puncture. Subarachnoid injection of 10 mg ropivacaine into 3 ml light specific gravity solution combined with sufentanil (2.5μg) was performed in the experimental group. The time of administration was 30s; and the control group was anesthetized with equal specific gravity ropivacaine 15 mg. The time of administration was 30s. 5min, 10min, 15min after anesthesia, the anesthetic effect and the anesthetic plane were tested respectively. After the effect reached the requirement of operation, the patient's position was adjusted and the subsequent operation was carried out.

2.3 Assessment Criteria

The difference of anesthetic effect and adverse reaction rate between experimental group and control group was verified by statistical software.

Anaesthesia: Sensory block time (test the sensory block plane with a cotton swab, A sensory block time (1-3 points) and an intraoperative analgesia score (T12) were recorded when the affected sensory block plane reached, One point indicates obvious discomfort or pain during the operation, Need intravenous sedation or analgesic drugs for adjuvant treatment; Two points indicate slight discomfort or pain during the operation, but without medication; 3 points indicate no discomfort or pain during operation, sensory recovery time (after injection of anesthetics to complete recovery time of lower limb sensation), motor recovery time (after injection of anesthetics to complete recovery time of lower limb movement), postoperative analgesia score (according to the patient's postoperative self-controlled analgesic pump and other anesthetic use of score assessment, Ten points, After the operation, the patient used a self-controlled analgesic pump deduction of 0.1 points, Deduct 1 point for each additional use of other analgesic drugs)[1].

Adverse reactions: hypotension, bradycardia, shivering, nausea and vomiting.

2.4 Statistical Methods

The SPSS 24.0 software was used to compare the difference of observation indexes between groups, the counting index was expressed by n(%), and the measurement index was expressed by (x±s). If the P value is less than 0.05, the difference between groups is meaningful.

3. Fruit

3.1 Differences in Anesthetic Effect between Experimental and Control Groups

Table 1 showed that there was no significant difference in sensory recovery time and motor recovery time between the experimental group and the control group (P>0.05), and the sensory block time in the experimental group was shorter than that in the control group, while the intraoperative analgesia score and postoperative analgesia score were higher than those in the control group (P>0.05).

3.2 Differences in the Incidence of Adverse Reactions between Experimental and Control Groups

Table 2 shows that the incidence of hypotension and shivering in the experimental group was lower than that in the control group, and the difference between the two

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Table 1. Differences in anesthetic effect between experimental group and control group (x±s)`

Group	n	Duration of sensory block (min)	Intraoperative analgesia score (score)	Feeling recovery time (min)	Exercise recovery time (min)	Postoperative analgesia score (score)
Experimental group	45	12.86±2.68	2.36±0.44	321.52±44.87	207.35±28.39	9.39±0.47
Control group	44	16.35±2.57	2.07±0.51	316.82±57.62	209.47±37.61	7.82±0.85
t	-	6.2681	2.8743	0.4299	0.3006	10.8152
p	-	0.0000	0.0051	0.6683	0.7645	0.0000

Table 2. Differences in the incidence of adverse reactions between experimental and control groups [n(%)]

Group	n	Low blood pressure	bradycardia	Cold War	Nausea and vomiting
Experimental group	45	0 (0.00)	2(4.44)	1(2.22)	2(2.22)
Control group	44	6(13.64)	1(2.27)	8(18.18)	1(2.27)
X2	-	4.5897	0.0004	4.6018	0.0004
p	-	0.0322	0.9842	0.0319	0.9842

groups was statistically significant, P<0.05.

4. Discussion

In the treatment of hip replacement in elderly patients with orthopaedic diseases, Quality intraoperative anesthesia is indispensable, Good surgical anesthesia can not only promote the smooth operation of patients, it also reduces surgical stress, It is helpful to improve the effect of postoperative recovery. This study found that, Experimental group with light specific gravity ropivacaine combined with sufentanil had shorter sensory block time than control group with equal specific gravity ropivacaine anesthesia (P<0.05), And the intraoperative pain score and postoperative pain score in the experimental group were also higher than those in the control group (P<0.05), between groups, there was no significant difference in sensory recovery time, motor recovery time and incidence of adverse reactions (P>0.05). The results demonstrate the high-quality effect of light specific gravity ropivacaine combined with sufentanil in elderly patients with hip arthroplasty. The reason for the results is that ropivacaine is a commonly used anesthetic, it has the advantages of good anesthetic effect, long aging and less adverse reactions. But sufentanil, as an analgesic, has the advantage of quick action, Although the duration is short, the analgesic and sedative effects are obvious, Therefore, the intraoperative pain score and postoperative pain score of the experimental group were higher. And, Application of light specific gravity ropivacaine combined with sufentanil, can reduce the patient's posture changes caused by blood pressure fluctuations [3]. The range of light specific gravity ropivacaine block is narrower than that of equal specific gravity ropivacaine, further reduce the incidence of hypotension, hypothermia [4-5]. High incidence of shivering after anesthesia in elderly patients, Shivering can lead to increased oxygen consumption, energy consumption, can induce the old patient coexisting cardiopulmonary basic disease, Increase intraoperative risk and postoperative complications [6-8]. Addition of opioid analgesics, sufentanil, can provide perfect intraoperative analgesia, Reduce the incidence of shivering among patients, clearly reduce the [9] of oxygen consumption and energy consumption caused by shivering. The postoperative analgesia is accurate, compared with the control group, the experimental group was [10] more likely to stand on the ground the next day. Early getting out of bed in elderly patients can reduce postoperative complications due to bed rest, such as pulmonary infection, thrombosis, muscle atrophy and other [11]. In the study of Geng Sujuan scholars, Ropivacaine alone reduces the duration of sensory block, But the combination of sufentanil can significantly improve the blocking effect, it helps to prolong the time of anesthesia and the effect of analgesia, and high security, Patients do not have severe adverse reaction [2]. The results of this study are basically consistent with the contents of this study, to further prove the good effect of ropivacaine combined with sufentanil subarachnoid anesthesia in the treatment of hip arthroplasty in elderly patients with orthopedic diseases, it is suggested that it can be used as an ideal anesthetic scheme in the treatment of elderly patients.

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Study on the Role of Vitamin D in Systemic Lupus Erythematosus

Jiadian Wang[1] Muzi Cui[2] Siyi Wang[3] Xiao Xue[1] Kerong Ren[4] ZhiLu Li[1] Saijia Li[1] Pingping Yan[5*]

1.The First Clinical School of Hainan Medical University, Haikou, Hainan, 570100, China
2.The Second Clinical College of Hainan Medical University, Haikou, Hainan, 570100, China
3.The Clinical College of Hainan Medical University, Haikou, Hainan, 570100, China
4.The School of International Nursing, Hainan Medical University, Haikou, Hainan, 570100, China
5.The Clinical Skills Center of Hainan Medical University, Haikou, Hainan, 570100, China

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ABSTRACT

Vitamin D is a hormone precursor with multiple biological effects. It binds to vitamin D receptors on target cells. It is an important participant in the metabolism of calcium and phosphorus in vivo. It is closely related to cell cycle, cell proliferation, differentiation, apoptosis, signal transduction and immune regulation. Its role in the treatment of infection, tumor and even immune diseases has been gradually recognized and studied. Patients with systemic lupus erythematosus generally have decreased levels of active vitamin D, and low levels of vitamin D are associated with disease occurrence, disease activity and complications. In the past ten years, a large number of studies have been carried out on it globally to explore the role of vitamin D in the occurrence and development of systemic lupus erythematosus. This paper summarizes its recent research progress.

1. Introduction

Systemic lupus erythematosus (systemic lupus erythematosus, SLE) is a connective tissue disease that is deficient in the ability to clear the deposited immune complex, to the extent that it causes damage to multiple important organs such as the brain, kidney, and heart. The pathogenesis is unclear, but it is generally believed that SLE pathogenesis is related to genetic, endocrine and environmental factors [1]. Studies such as Muller showed for the first time that low vitamin D levels may be linked to SLE development in 1995[2] .Since then, the study on the relationship between the two has never been interrupted, from the regulation of peripheral bone metabolism mechanism to the regulation of cell pleiotropic regulation, especially after the discovery of the expression of vitamin D receptor (vitamin D receptor, VDR) on the surface of immune cells, More studies on vitamin D and SLE immunomodulatory properties have been stimulated. Studies have confirmed that vitamin D deficiency in SLE patients is more obvious than in other immune diseases or healthy people, which may be related to light allergy and lack of light in SLE patients. And the use of glucocorticoids and other

**Corresponding Author:*
Pingping Yan,
Female, bachelor degree,
The Clinical Skills Center of Hainan Medical University, Haikou, Hainan, 570100, China;
E-mail: 1289762133@qq.com.
First author:
Jiadian Wang,
Male, undergraduate of The First Clinical School of Hainan Medical University;
E-mail: 1345528391@qq.com.

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drugs in the treatment process accelerated the loss of vitamin D. Studies have also investigated differences in the prevalence of SLE races and regions, and found that the prevalence rate in high latitudes and non-white countries is higher, presumably because the vitamin D deficiency in these races is more significant, which is more likely to induce SLE[3]. So far, a large number of studies have tried to explore the relationship between vitamin D deficiency and SLE disease pathogenesis, disease activity, organ injury and laboratory parameters, but the results are still inconclusive. This paper reviews the research progress of active vitamin D physiology, deficiency related diseases, clinical application and its relationship with SLE.

2. Physiology of Vitamin D, Disease Related to Deficiency and Clinical Application

2.1 The Production and Mechanism of Vitamin D

The production and mechanism of vitamin D is a liposoluble ring-opening steroid. Its essence belongs to cholesterol. There are three main sources of production, namely, dietary source, skin production after sunlight exposure and drug supplement. Vitamin D in humans are synthesized mainly by skin exposure to ultraviolet light, while only a small fraction (<10%) is a dietary source[4]. Vitamin D mainly includes vitamin D2 and D3. Vitamin D2, also known as ergot calcitriol, is produced by ultraviolet radiation, mainly in yeast and plants. Vitamin D3, also known as cholecalciferol, is converted from 7-dehydrocholesterol in the skin after absorbing ultraviolet radiation. Vitamin D3 also comes from deep-sea fish oil and dairy products. The main source of human vitamin D is skin synthesis. Vitamin D2 and D3 are metabolized to form active vitamins D: ossified triols (1,25-dihydroxyvitamin-D, 1,25- $(OH)_2$-D)[5-6].Vitamin D metabolism is a complex process, including ultraviolet radiation and hydroxylation, synthesis and catabolism. The process of forming active vitamin D requires one hydroxylation in the liver and one in the kidney, and finally the synthesis of 1,25-(OH)2-D in the kidney. 1, 25-$(OH)_2$-D. In addition to kidney synthesis, Extracrenal synthesis also exists in many tissues, Like parathyroid glands, keratinocytes and immune cells, etc. Synthetic active vitamins must be linked to vitamin D receptors (vitamin D receptor,); and VDR) only after binding can play biological activity. VDR are expressed in a variety of body tissues, including brain, heart, skin, gut, gonad, prostate, mammary gland, immune cells, as well as bone, intestine, R kidney and parathyroid gland. Many immune cells containing VDR include monocytes, macrophages, dendritic cells and activated T and B cells, And these immune cells also have hydroxylase (25-hydroxyvitamin D-1alpha hydroxylase,) in them CYP27B1), Precursor vitamin D converted into active vitamin D[7] .

2.2 Vitamin D Deficiency Related Diseases

Vitamin D in addition to its classic function, the human body vitamin deficiency D also associated with many chronic diseases[5,6], These include immune diseases such as multiple sclerosis, rheumatoid arthritis, type 1 diabetes, inflammatory bowel disease, mixed connective tissue disease, autoimmune thyroid disease, scleroderma, systemic lupus erythematosus cardiovascular diseases such as coronary heart disease, hypertension, heart failure, sudden cardiac death, malignant tumors such as colon cancer, breast cancer, non-Hodgkin lymphoma and neurological diseases such as Alzheimer's disease[7,8].One Meta analysis suggests that lower and higher levels of 25-(OH)- D are associated with increased risk of disease mortality, and that ultraviolet radiation may affect many of the processes associated with vitamin D production in the body[2].As more and more research has been done on vitamin D in recent years, it has been found that it is more and more relevant to many diseases, especially in the field of immune diseases.

2.3 Clinical Application of Vitamin D

Most of the active vitamin D drugs commonly used in clinic are the third generation new vitamin D analogues. They are widely used in osteoporosis, hyperparathyroidism, chronic kidney disease, psoriasis and tumor.

3. Study on the Role of Vitamin D in SLE

3.1 Related Factors of Vitamin D Deficiency in SLE Patients

Serum 25-(OH)- D levels were clinically used as criteria for evaluating vitamin D levels in vivo. Studies have confirmed that levels of 25-(OH)-D in SLE patients are significantly inadequate or deficient, even if necessary vitamins are added D, this state of reduction or deficiency may still exist[9].The main reasons include the following. ① Lack of light: time, season, latitude of residence, light allergy, age and other factors may lead to reduced skin reception of ultraviolet B, as a result, vitamin D synthesis is inadequate, A significant increase in the probability of SLE. ② Application of Glucocorticoids: This drug promotes the metabolism of vitamin D, and so in the course of SLE treatment, A higher dose of vitamin D is needed to meet your balance. ③ Vitamin D activates and upregulates 24-hydroxylase to induce self-degradation, SLE activated B cells in patients upregulate the enzyme, the

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increase D vitamin degradation leads to its lack of [10]. ④ SLE VDR gene polymorphism, anti-antibody production, kidney damage, smoking, braking and other factors can also affect vitamin D levels and effects[11].

3.2 Relationship between VDR Gene Polymorphism and SLE Pathogenesis

The results of current research on the relationship between VDR gene polymorphisms and SLE risk, the difference of sample size, gene selection may lead to the emergence of different results. The results of a meta-analysis of VDR gene BsmI, FokI, ApaI or TaqI and the risk of SLE disease, BsmI B alleles are associated with SLE risk, FokI FF are susceptible genotypes of Asian SLE populations, FokI T /C and TaqI genetic polymorphisms were not associated with Caucasian disease, ApaI is not associated with SLE risk[12].Piantoni and other studies, The genotype appears more frequently ApaI AA SLE patients, Similar to Bb, BB BsmI B allele and FokI FF genotype, Also associated with SLE risk, ApaI AA, BsmI BB and FokI FF genotypes were also significantly associated with lupus nephritis and high activity of SLE diseases. Related studies have also found a significant correlation between Apa and BsmI gene polymorphisms, ApaAa-bb genotype was significantly associated with the onset of Han SLE in China, this genotype is mainly associated with polyplurisy, involvement of the blood system, and high titer antibody production[13-16].

3.3 Relationship between Active Vitamin D Level and SLE Disease Activity

Studies have shown a close relationship between low vitamin D levels and SLE disease activity[9,11,17]. Among them, Squance and other [18] found that patients with reduced or deficient vitamin D were more likely to express high titer anti-nuclear antibodies and anti-binary DNA antibodies, the results suggest that vitamin D may be associated with the pathogenesis of SLE. Schoindre and other [19] studies SLE initial treatment of patients found, Patients with SLE disease activity score (SLEDAI score)≥6 had lower levels of vitamin D, The result has certain clinical significance; Besides, Sahebari and other [20] also show that, Vitamin D levels were negatively correlated with SLEDAI scores, and identified glucocorticoids and other drugs, obesity and kidney involvement as risk factors for further vitamin D deficiency in patients.Nevertheless, the SLEDAI score did not include smooth muscle involvement and myocardial involvement in the scoring system, so McGhie and other [21] studied the relationship between vitamin D and the index score of British lupus assessment group. The results showed that low vitamin D level was negatively correlated with the score. AlSaleem and other [22] confirmed that vitamin D levels were negatively correlated with SLE disease activity, and given adequate vitamin D treatment in active children. The results showed that the disease activity decreased significantly and the renal and joint symptoms improved significantly. This conclusion is consistent with the results of cross-sectional studies in adults and young people [23-24].Combined with the above results, the mechanism mainly includes the following aspects: ① vitamin D can enhance cell chemotaxis, induce macrophage activation, inhibit dendritic cell maturation, and affect antigen presentation, attenuating helper T cells (T helper cell,); and Th11 and Th17 responses, Enhanced Th2 function, Promoting TGF β and forkhead transcription factor gene expression through CC chemokine receptor 4 expression, and increase the number T regulatory cells, Enhance its migration ability. But, uh, The balance in SLE patients with vitamin D deficiency is further disrupted, To make interleukin 6,10, excessive secretion of cytokines such as tumor necrosis factor α, α interferon, To promote disease progression[13,25-26], Imbalance of cytokine secretion mediates hyperactive B cells, Causing plasma cell differentiation to produce antibodies, Causes SLE multiple organs to be tired [27-29]. The study found, the disease activity of SLE patients with low vitamin D level was [30] with the expression of interferon in plasma. Aranow and other [31] have confirmed, Vitamin supplements may D reduce the secretion of α interferon, Improving disease activity and laboratory indicators. ② Vitamin D can induce early apoptosis of activated B cells and decrease the function of B cells, while vitamin D deficiency causes excessive activity of B cells and increase the level of autoantibodies, which leads to the damage of multiple organs[10]. ③ Vitamin D inhibits apoptosis of mononuclear cells in peripheral blood by up-regulating the Bax, FasL expression of B cell lymphoma / leukemia gene and down-regulating the apoptosis related gene[25]. ④ Vitamin D deficiency is significantly associated with shortening of SLE telomeres, while previous studies have confirmed that SLE patients have shorter telomeres and higher activity of anti-terminal antibodies, suggesting that anti-terminal antibodies are significantly associated with disease activity in SLE patients[32].None of these studies confirmed SLE relationship between disease recurrence and vitamin D deficiency, which may be responsible for the short follow-up period.

3.4 Relationship between Vitamin D Deficiency and SLE Complications

Studies have shown that SLE patients with low vitamin

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D have a higher percentage of bone mineral content and a higher risk of fracture[33], The deficiency of active vitamin D in vivo destroys the bone metabolism balance between osteoblasts and osteoclasts, affects the secretion of osteoprotegerin/nuclear factor kB receptor activator ligand and the establishment of bone transformation microenvironment involved in it[34-36].Recently, it has been found that SLE mesenchymal stem cells have differentiation defects, which may be another cause of SLE related osteoporosis[37], There is no correlation between active vitamin D and SLE defective mesenchymal stem cells. Low levels of vitamin D are associated with SLE with insulin resistance, dyslipidemia, cardiovascular risk and mental state, and reduced levels of vitamin D in non-diabetic patients increase insulin resistance and hyperlipidemia[38].Also, vitamin D can reduce cardiovascular risk by reducing the expression of chemokine ligand 10, improving endothelial cell function and repairing angiogenesis cells [39-41]. A study of neuropsychiatric lupus found that vitamin D deficiency is an important factor in sleep quality decline, fatigue and cognitive impairment[42-43].

3.5 Intervention Therapy for Vitamin D

There are many studies on vitamin D intervention SLE at home and abroad, the differences of disease activity, inflammatory factors, autoantibodies and prognosis before and after vitamin D supplementation in SLE patients were compared. Research on vitamin D3 in SLE children with low vitamin D 2000U, 1 daily and 600 mg, calcium Two interventions per day, We found kidney damage three months later, SLEDAI scores and autoimmunity markers were improved[22].The findings are consistent with the findings of another cross-sectional study of young people and adults[44-45].Studies have shown that the combination of different doses of vitamin D in SLE patients can reduce the level of urine protein, the expression of interleukin-1, tumor necrosis factor α, anti- dsDNA antibody in serum, and reduce the disease activity of patients[11,17].Lima and other [46] conducted a 24-week randomized, double-blind, controlled trial of SLE patients with juvenile onset. the results showed that after the patients were treated with active vitamin D, the disease activity and fatigue score decreased compared with before treatment, and the symptoms of fatigue and fatigue were also improved. Nevertheless, a prospective study that treated premenopausal SLE patients with different vitamin D supplementation regimens found that although vitamin D levels were elevated and the treatment was safe and effective, no significant improvement in SLE disease activity and serological indicators was observed [47] either regimen.In addition, the following findings were found in the in vitro intervention test: ① The increase of CD T cell ratio in ① SLE patients can improve the degree of T cell dysfunction and cause phenotypic amplification. Active vitamin D may participate in the of immune tolerance mechanism of lymphocytes[48]. ② Vitamin D may be associated with a particular mode of cell death NETosis White blood cells isolated from peripheral blood were treated with different concentrations of vitamin D. The results showed that the number of early apoptosis of white blood cells in the treated samples was significantly reduced and the damage of endothelial cells was reduced by NETosis methods[49]. ③ such as Wahono and Wu found that low active vitamin D levels affected dendritic cell maturation and Th17, regulatory cell activation. Treatment of isolated cultured peripheral blood monocytes and lymphocytes with different concentrations of active vitamin D, The results showed that the treated cells could slightly upregulate the β, of regulatory T cells and TGF and inhibit dendritic cell maturation and Th17 activation[51-52].

4. Conclusion

While there are many studies on the relationship between vitamin D and SLE, it is difficult for most studies to clarify the true significance of long-term vitamin D deficiency in the process of SLE disease. While vitamin D, as an immunomodulator, can inhibit the secretion of inflammatory factors, reduce SLE antibody titer, reduce renal damage and reduce disease activity, and play a regulatory role in many immune pathways, the above effects are inevitably controversial. Moreover, in clinical work, the best time for vitamin D supplementation in SLE patients and the choice of supplementary dose are not clear, and more research is needed. Whether active vitamin D and its analogues can become the third kind of drugs to treat SLE or improve its complications in addition to hormones and immunosuppressants in the future will become a new direction for researchers to understand the mechanism of rheumatism and treat immune diseases.

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Research Progress on the Influence of Movement Instruction on Community Life in Patients with Coronary Heart Disease

Jiayi Zhang[1] Weiyi Shi[2] Yang Yan[1] Yifan Zheng[1] Qifeng Wang[1] Xinxin Zhou[1] Zhilu Li[1] Jing Zhang[3*]

1.First Clinical College, Hainan Medical University, Haikou, Hainan, 570100, China
2.Hainan Medical University School of International Education, Hainan Medical University, Haikou, Hainan, 570100, China
3.The First Affiliated Hospital of Hainan Medical University, Haikou, Hainan, 570100, China

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ABSTRACT

The incidence of coronary heart disease increases year by year with the material level of our country. It has a harmful effect on the patient's life health and quality of life. Movement Instruction is an important aspect of the secondary prevention project of cardiac rehabilitation in patients with coronary heart disease. Although it has a history of decades at inland and abroad, the present situation in China is not optimistic. Some studies have shown that the popularization and participation of cardiac rehabilitation is true and lacking. This paper sums up the relevant knowledge of coronary heart disease, coronary heart disease movement instruction and its impact on community life of patients at home and abroad, and reviews the research results of movement instruction on community rehabilitation of coronary heart disease in recent years, which provides a theoretical reference and prospect for the future research of community exercise rehabilitation of coronary heart disease.

1. Introduction

With the development and progress of society, the improvement of people's living conditions has grown up to be a major cause of cardiovascular disease, and the incidence rate is increasing year by year[1]. Coronary atherosclerotic heart disease (Coronary atherosclerotic Heart Disease, CHD) Coronary heart disease (CHD) is caused by ischemia or necrosis of the myocardium caused by imbalance of coronary blood supply and myocardial oxygen demand, which in turn leads to the occurrence of heart disease. Many years of research have confirmed that hypertension (hypertension. Hp) is the most dangerous neutral factor in the CHD of blood[2]. Exercise rehabilitation is an important part of the secondary prevention program of heart rehabilitation in patients with coronary heart disease. Movement instruction is an im-

**Corresponding Author:*
Jing Zhang,
The First Affiliated Hospital of Hainan Medical University, Haikou, Hainan, 570100, China;
E-mail: 2317368645@qq.com.
First Author:
Jiayi Zhang,
Female,undergraduate,
Hainan Medical University,Haikou,Hainan,570100,China;
E-mail:1369057929@qq.com

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portant aspect of exercise rehabilitation, movement instruction can improve cardiopulmonary function according to the patient's history of disease[3]. In our country, the popularity and participation of cardiac rehabilitation are relatively scarce[4]. The treatment of cardiovascular diseases is becoming more and more mature, but cardiac rehabilitation is limited to the third Class A hospitals. Movement instruction can be completed by rehabilitation therapists and rehabilitation physicians in the hospital, and exercise prescriptions are delivered by rehabilitation physicians. Patients are advised to train under the guidance of rehabilitation therapists, but most of the patients with coronary heart disease are located in various communities, where the lack of scientific movement instruction and appropriate training is not optimistic[5]. Based on this, this paper reviews the research on the effect of exercise on the life of patients with coronary heart disease in the community.

2. Research Progress on Coronary Heart Disease

2.1 Incidence and Fatality Rate

Coronary heart disease is caused by various causes such as hyperlipidemia, hypertension, smoking, coronary obstruction and stenosis, which in turn lead to myocardial ischemia, angina pectoralis and even myocardial infarction[6]. The incidence in our country is very high[7], the fatality rate also remains high all year round[8]. In addition, coronary heart disease remains the leading cause of high mortality in developed countries and globally, except in developing countries such as China[9].

2.2 Effects on Life

Some patients with coronary heart disease may develop symptoms such as poor sleep quality, loss of appetite and anxiety and depression along with increased psychological stress[10]. Most patients with coronary heart disease in China are more inclined to receive relatively meticulous and high-level treatment in Grade 3A hospitals. In the long run, not only the patients' own economic burden will become heavier, but the medical social resources will also be wasted because of long-term occupation[11-12].

3. Research Progress of Movement Instruction for Coronary Heart Disease

A large number of studies have shown that proper exercise training in patients with coronary heart disease is helpful to establish coronary collateral circulation, improve blood supply of cardiac muscle cells, and improve cardiopulmonary function[13], Chen Jianjian et al[14] graded motion tests[15]. The patients with coronary heart disease were subjected to incremental load exercise, and the corresponding targeted aerobic exercise was tested to confirm that professional cardiopulmonary movement instruction could improve the cardiopulmonary function of the patients. Chen Xuanzu and others[16] individualized movement instruction was used to guide patients with coronary heart disease cardiac function grade III and above to carry out a control test, adjust exercise intensity, exercise frequency, exercise type and exercise time according to different patient conditions, customize individualized exercise prescription, urge patients to train and follow up regularly. The control results confirmed that individualized movement instruction could improve blood glucose and blood lipids in patients with coronary heart disease. A meta-analysis showed that traditional Chinese medicine exercise therapy such as Taijiquan and Baduanjin can effectively improve the physical function and mental state of patients[17]. Yue Shuang et al[18] with the concept of "double heart" treatment, the author emphasizes the improvement of heart function of patients with coronary heart disease and pays attention to its common psychological problems[19]. Negative emotions such as anxiety and depression can increase the risk of coronary heart disease and death[20], Li Xinpeng and others[21]. For patients with coronary heart disease with negative emotions such as anxiety and depression, traditional Chinese medicine rehabilitation exercise was used to guide exercise, improve the negative emotions of patients and improve the quality of life of patients. Movement instruction not only affects the above physiological and psychological factors in patients with coronary heart disease, but also a large number of evidence-based medicine[22]. Evidence also suggests that cardiac rehabilitation movement instruction can effectively delay the development of coronary atherosclerosis [23]. To prevent recurrence, repeated admission treatment, while relieving the economic pressure of patients while prolonging the survival time.

4. Study on the Influence of Exercise on Community Life of Patients with Coronary Heart Disease

4.1 Research on Community Life of Coronary Heart Disease Patients Guided by Exercise in China

Guo Yuanhang[4], there are more than 500 specialized heart rehabilitation centers in China up to 17 years[24]. Some areas such as southwest and northwest lack atten-

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tion to cardiac rehabilitation. As an important part of heart rehabilitation, movement instruction requires professional guidance from rehabilitation therapists and rehabilitation physicians, while the number of rehabilitation teams in China is at present[25]. Not enough to meet over 700,000 people per year[26]. The needs of surgical patients. At present, the importance of cardiac rehabilitation in China is not high[27]. The patients didn't realize the value of cardiac rehabilitation correctly, and the exercise prescription wasn't long-lasting. At the same time, Professor Lu Xiao said that in order to improve the safety factor. Emergency drugs should be prepared at the side of the training, and rehabilitation therapists should be required to master certain knowledge of first aid. If patients in the community for remote movement instruction should also follow in order to prevent accidents, timely rescue. Under the hierarchical medical system[28]. Therapists in community hospitals will be responsible for the exercise of coronary heart disease in the community, rehabilitation outside the hospital, and effective conservation of medical resources[29]. Timely professional assessment of patients within the community[30] consolidation of curative effects[31]. However, there is still a problem of uneven distribution of local medical resources, North and South China generally attach importance to the third phase rehabilitation of patients with coronary heart disease[32]. Therefore, as mentioned above, movement instruction affects the physical and psychological factors of patients with coronary heart disease.

4.2 Progress of Community Life Influence in Coronary Heart Disease Patients

Report[33] pointed out that the number of deaths due to cardiovascular diseases in China increased year by year in 2016, while the number of deaths due to cardiovascular diseases in foreign countries, such as Japan, the United States, Germany and other countries a year earlier[34]. The European and American countries have formed a mature system, the community center and rehabilitation center docking, to ensure that patients in the community can receive regular rehabilitation therapists for their movement instruction, and more humane settings such as treatment groups, patients can communicate and interact. The system of pre-hospital and in-hospital heart rehabilitation is more mature, such as the closed-loop model in the United States, where rehabilitation teams work together to complete a set of movement instruction programs and supervise implementation[35]. In Asia, Japan also has a more mature heart rehabilitation system because of its early integration with the European and American systems. It is also worth learning in the direction of long-term rehabilitation outside the hospital. Because the system is relatively mature, community exercise in these countries guides patients with coronary atherosclerotic heart disease to complete the training program issued by the rehabilitation team[36].

5. Conclusion

With the leap of the material level and the improvement of living conditions, the number of patients with coronary heart disease in China is increasing year by year, and the incidence, mortality and treatment are not optimistic. Coronary heart disease rehabilitation as an important post-operative recovery means for patients with coronary heart disease can effectively enhance the quality of life and improve the recovery effect. His role has been paid more and more attention by researchers at home and abroad. And related research is gradually increasing. However, the popularization of community rehabilitation still needs to be strengthened, the theoretical system of coronary heart disease rehabilitation is expected to be more and more perfect, and the primary therapeutic treatment for patients with coronary heart disease is more and more.

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Research Progress on Job Burnout of Family Doctors

Huiying Zhai*

School of Nursing, Guangdong Pharmaceutical University, Guangzhou, Guagndong, 510310 China

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ABSTRACT

Job burnout is an important factor affecting the work attitude and professional behavior of family doctors. This paper reviews the measurement tools, influencing factors and intervention strategies of job burnout, it is suggested that improving job burnout can improve job satisfaction, work efficiency and reduce turnover intention of family doctors, and it is of great significance to the construction of family doctor team and the improvement of work quality.

1.Introduction

Burnout, also known as "job burnout", refers to the state of physical and mental fatigue and energy exhaustion in the face of continuous workload[1]. The term "job burnout" was first put forward by American psychological expert Freudenberger and then summarized by Maslach.[2] The psychological syndrome caused by continuous emotions and interpersonal stressors at work is called job burnout. As an important support of community health management, family doctors undertake the management of chronic diseases, infectious diseases and population health management tasks, with heavy workload and heavy medical tasks. They are the potential high incidence group of job burnout. Job burnout will affect the family doctor in work.[3-4]

2.Job Burnout of Family Doctors

The research on family doctors' job burnout was carried out earlier abroad. The United States, the United Kingdom, Germany and other countries, which are the first European countries to implement the family doctor service model, have carried out relevant research and achieved a series of results.[5] According to a study on the job burnout of 27276 doctors carried out by US researchers, the incidence of job burnout of general practitioners in family medicine field is higher, ranking in the top five. [6] conducted a job burnout analysis of 232 family doctors in the UK from March 2016 to August 2017, and the results showed that 22.7% and 72.7% of general practitioners in the field of family medicine were in the top five the degree of job burnout is related to family doctors' job well-being. In Germany, researchers selected 214 general

**Corresponding Author:*
Huiying Zhai,
Research direction: Chronic disease care;
School of Nursing, Guangdong Pharmaceutical University, Guangzhou, Guagndong, 510310 China;
E-mail: 872938648@qq.com.

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practitioners for analysis and found that female doctors had a higher risk of emotional exhaustion and a lower degree of job satisfaction.[7] A survey of 683 general practitioners in Ireland shows that age and gender are related to the degree of job burnout of family doctors.[8-9] conducted a cross-sectional survey of 196 general practitioners and found that the incidence of moderate and high emotional exhaustion, depersonalization and personal accomplishment were 34.7%, 33.5% and 67.8% respectively. Researchers analyzed 183 general practitioners in Israeli community medical centers, and found that job burnout of general practitioners in the community was affected by job stress and job satisfaction.[10] In Japan, researchers found that the level of job burnout of middle-aged general practitioners is higher than that of young family doctors. [11] In contrast, the domestic research on family doctors' job burnout is less than that abroad. Researchers investigated the job burnout of 85 general practitioners working in Shanghai suburban community health service centers, and found that the incidence of moderate and severe job burnout was 40.0%, and the job burnout was serious among the selected general practitioners; Others investigated 135 general practitioners nationwide, and the results showed that job burnout had an impact on their turnover intention People with high level of burnout are more willing to leave. Combined with the research and analysis at home and abroad, the degree of job burnout affects the work of family doctors, relates to the work efficiency and quality of staff, and becomes a key topic in the psychological aspect of community family doctors.

3.Influencing Factors of Family Doctors' Job Burnout

The influencing factors of family doctors' job burnout include many aspects, including individual, social, organizational and other factors. Job burnout brings pressure to family doctors, and a higher degree of burnout may even affect their physical and mental health.

3.1 Individual Factors

Through research concluded that there is a positive correlation between age and the level of job burnout, and the level of job burnout of the elderly is higher than that of the young. [12] At the same time, the degree of job burnout is also affected by the individual's own personality traits. Compared with extroverts, introverts have higher degree of job burnout. Researchers conducted a survey on family doctors in Hungary, and found that the incidence of female job burnout is higher than that of male, which may be related to female family doctors' need to bear the dual pressure of occupation and family. Therefore, they are more likely to have job burnout than male family doctors.[13]

3.2 Social Factors

The family doctor model originated in foreign countries and began to be carried out in China in 2012, which was gradually promoted by Shanghai, Beijing, Hangzhou and other cities. [14] The social factors influencing family doctors' job burnout are related to the local government's investment in community health care and the trust relationship between doctors and patients. Due to the difference between the development time of family doctors in China and the amount of funds invested by the government in the community health system, in cities with earlier development time and more developed economy, the government has invested more in the medical service of family doctors. The survey shows that the degree of job burnout of family doctors in cities with high economic level is higher than that in cities with low economic level. [15] The degree of harmony between the contract signing group and the family doctor team members also has an impact on the job burnout of family doctors. During the follow-up, the medical staff with high degree of trust and cooperation with the contract signing crowd had better job burnout.[16]

3.3 Organizational Factors

The organizational factors influencing family burnout include occupational stress, work environment, work family conflict, role influence and organizational support.[17] Experts found that workload has a significant impact on job burnout. conducted a survey on primary health care workers in Malaysia.[18] The results showed that the satisfaction of the staff to their departments would affect the level of job burnout, and the staff with low satisfaction to their units and departments had a higher level of job burnout. Nantha found that the infrastructure of institutions is not perfect, and the working environment is poor, especially in some economically underdeveloped areas, which will make the grassroots medical staff lose their enthusiasm and vitality for work.[19] Experts conducted two surveys on primary care doctors in the United States, and the results showed that adverse working conditions would deepen the degree of job burnout and reduce job satisfaction.[20] At the same time, the conflict between work and family will also affect the level of job burnout, medical staff as a member of the family, for the family is very important. Research's found that after alleviating work family conflict, the level of job burnout decreased.[21] As the role of family doctor is the bridge between community

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medical service and contract signing population, family doctor needs to complete his own task and take responsibility due to his work responsibility and expectation. We should not only be responsible for the contract signing crowd, but also deal with the role that should be done to adapt to the work mode, so the degree of role adaptation has an impact on the job burnout of family doctors. Lack of support and encouragement in work will also affect the job burnout of family doctors. In the face of work, the job burnout of the staff with higher support from leaders and colleagues and harmonious relationship among colleagues is better.[22]

3.4 Other Factors

The job burnout of family doctors is also affected by some other factors. For example, researchers found that the personal coping ability of family doctors has a significant impact on the job burnout of family doctors in medical work.[23] Others found that the relevant training needs and academic requirements of doctors are important influencing factors of job burnout.[24]

4.Intervention Measures and Coping Strategies of Family Doctors' Job Burnout

4.1 Relieve Fatigue Based on Mindfulness Training Mode

Mindfulness training (MT) was proposed by Dr. karbakin of Massachusetts University in 1979 at Massachusetts Medical College. It is applied in the field of medical care to help staff alleviate negative burnout, reduce work anxiety, objectively evaluate and accept themselves, improve negative thinking and eliminate negative energy in their hearts.[25] The research of foreign experts shows that after four weeks of mindfulness training, the degree of job burnout of the participants has been alleviated, the symptoms have been improved, and they have a higher love for themselves and their work. Domestic researchers found that the job burnout of the medical staff in the blood purification center has a significant improvement effect, reducing the effect of anxiety and job burnout, and improving the bad mood. Researchers shows that through mindfulness training for 4 weeks and 8 weeks, family doctors' job burnout is improved, and the training effect of 8 weeks is better, and their job satisfaction is higher.[26] The results show that mindfulness training can reduce the burnout of medical staff and improve their well-being. In addition, according to the study, mindfulness training can improve the quality of sleep, help the body maintain a peaceful state of mind, and then improve the status of job burnout.[27] Therefore, through this way, from the physical and mental point of view, reduce psychological negative energy, eliminate bad emotions, and reduce the degree of burnout.

4.2 "Balint Group Sharing Communication Method" Was Used to Reduce Burnout

Balint group method, named after Balint, a famous psychoanalyst, was first applied to family doctors as a means of communication in their work practice, usually in the form of group discussion. In 2003, German research experts introduced Balint group method into China, and first applied it in the training of Shanghai Tongji Hospital, a general hospital. The selected research object was community family doctors at first, and then it was extended to other medical staff in the medical field, including nurses, medical managers, etc., and achieved good results. The results show that: through Balint group, community family doctors can better understand their own work, alleviate the job burnout of community family doctors, improve the professional skills of medical staff and improve the doctor-patient relationship. Through empathy and communication skills, we can better understand each other's professional identity and increase job satisfaction. Foreign studies also show that Balint group activities can help family doctors better deal with difficult clinical situations, improve communication skills, further promote the development of doctor-patient relationship, release work pressure and improve job burnout. Researchers used Balint method to randomly divide the family doctors into two groups.[28] The intervention content included two lectures and 10 Balint courses for six months. After the training, all participants measured and evaluated the job burnout and job satisfaction before and after the intervention. The results showed that Balint group interactive communication method could meet the needs of medical staff the level of job burnout was lower than that before the test. Researchers proved that this method can effectively reduce the burnout of family doctors by carrying out the Balint group method for at least one year and comparing the job burnout before and after the training.[29] The research shows that the family doctors trained by Balint method have higher enthusiasm in work than those not trained by Balint method. Therefore, it is feasible to take Balint group method to alleviate the job burnout of family doctors. Balint group method can be further developed and spread to reduce the job burnout of family doctors.

5.Conclusion

To sum up, there are many researches on family doc-

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tors' job burnout at home and abroad, while there are few literatures on coping strategies and intervention of family doctors' job burnout. Therefore, further exploration and practice are needed to help family doctors establish a good working attitude, maintain a positive and enthusiastic working state, improve the team's collective quality, and promote the development of community medical practice.

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Risk Factors and Distribution of Pathogens for Pulmonary Infection in Patients with Severe Acute Pancreatitis

Quanshui Peng Peng Chen* Di He

Department of Hepatopancreatobiliary Surgery, The 2nd Affiliated Hospital of Kunming Medical College, Kunming, Yunnan, 650000, China

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ABSTRACT

Objective: To investigate risk factors and distribution of pathogens for pulmonary infection in patients with severe acute pancreatitis. **Methods:** The clinical data of 285 patients with severe acute pancreatitis were retrospectively analyzed. Sputum specimens of patients with lung infections were studied. Univariate analysis and logistic regression were performed to screening the factors correlating to lung infections. **Results:** Gram-negative bacilli were the principal microorganisms isolated from those lung infections, and these bacterial pathogens demonstrated a marked pattern of antibiotic resistance. It was identified that age (OR 1.05, 95% CI 1.01-1.09, p=0.01), Ranson scores (OR 3.01 , 95% CI 1.13-8.03, p = 0.03) and surgical treatment (OR4.27, 95% CI 1.03-17.65, p = 0.04)were independent risk factors of lung infections in patients with severe acute pancreatitis. **Conclusion:** Analysis of pathogen spectrum and drug sensitivity will contribute to choosing antibiotics empirically. And preventive measures aimed at risk factors could help reduce the incidence of lung infections in patients with severe acute pancreatitis.

1.Introduction

Acute pancreatitis (AP) is a common acute abdomen, the incidence of AP in the world is 10~80 cases /100000 people, the overall mortality in clinic is 5%~10%, and the mortality in severe cases can be as high as 30%[1-2]. The common causes include drinking alcohol and gallstones[3]. 15-20% of which are severe acute pancreatitis (SAP). SAP progresses rapidly with many complications, making it difficult to treat[4]. Since there is damage to acinar cells in the AP, it may cause multiple organ dysfunction syndrome (MODS)[5] in the acute phase of the disease, while in the middle and late stage of the disease, the extra-pancreatic tissue infection is caused by the displacement of intestinal bacteria (Extrapancreaticinfec-tions, EPI) [6].With the progress of SAP treatment, the number of early deaths due to organ dysfunction has gradually decreased. Infection-related complications have become the main cause of death in SAP patients. The results of many retrospective studies show that the clinical mortality of infected patients is significantly different from that of those with no infection, so infection has a great influence on the prognosis of AP patients, especially SAP patients[7-9]. Among them, lung infection is a common infection-related complication, whose incidence is as high as 11%

**Corresponding Author:*
Peng Chen,
Department of Hepatopancreatobiliary Surgery, The 2nd Affiliated Hospital of Kunming Medical College, Kunming, Yunnan, 650000, China;
E-mail: 3077338088@qq.com.

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-30%[10], seriously affecting the treatment and prognosis of SAP patients[11]. The reason why SAP is prone to lung infection may be related to decreased immunity and the damage of endothelial cells and alveolar epithelial cells caused by excessive activation of inflammatory molecules[12]. SAP patients' lung infections are mostly hospital-acquired pneumonia, and prevention should be stressed. Finding out the risk factors of lung infection will help us to take targeted preventive measures to reduce the occurrence of it. Understanding the distribution of pathogenic bacteria in lung infections complicated by SAP is of great significance to the empirical medication of lung infections.

This paper conducts a retrospective analysis of 285 SAP patients in the Second Affiliated Hospital of Kunming Medical University from June 1992 to June 2017, aiming to provide constructive opinions for future clinical practice and better prevent and deal with SAP patients' lung infections.

2.Materials and Methods

2.1 Research Object

285 SAP patients in the Second Affiliated Hospital of Kunming Medical University from June 1992 to June 2017 were selected. The diagnostic criteria for SAP are based on the "Guidelines for the Diagnosis and Treatment of Acute Pancreatitis in China (2013, Shanghai)" by the Pancreatic Disease Group of the Chinese Medical Association Digestive Disease Branch [13]. The diagnostic criteria for lung infection adopt the "Diagnostic Criteria for Nosocomial Infection" approved by the Chinese Lung Infection Administrative Association [14]. Patients with incomplete clinical data were excluded.

2.2 Research Method

① Summarize the incidence of lung infection and its mortality among the included cases. ② Bacterial spectrum analysis: The strains were derived from the sputum culturing results of the included patients with lung infection, and were identified by the French Mérieux Vitek 32 automatic bacterial identification instrument. For drug susceptibility testing, the K-B disc method was used. As for the diagnostic criteria for drug resistance, the standards of the National Committee for Clinical Laboratory Standardization (NCCLS) were adopted. ③ Analyze the risk factors of lung infection in the patients. 52 of the 285 SAP patients had lung infection, and they made up the case group. The control group, consisting of 52 cases without lung infection, were randomly selected from the rest 233 patients. 16 risk factors were chosen based on relevant literature reports and clinical experience: gender, age, body mass index (BMI), Ranson score at admission, history of smoking (smoking for more than 10 years), history of drinking (drinking every day for more than 5 years), history of chronic obstructive pulmonary disease (COPD), history of hypertension, history of diabetes, blood amylase level at admission, urea nitrogen level at admission, albumin level at admission, ventilator treatment, indwelling gastric tube for more than 10 days, surgical treatment, and hormone therapy. SPSS13.0 software was applied to statistical analysis. Measurement data was expressed as mean plus or minus standard deviation, and counting data was expressed as percentage. Measurement data and counting data respectively used t test and $\chi 2$ test to compare the differences between the case group and the control group, looking for factors related to infection. Single-factor analysis of statistically significant risk factors was followed by logistic regression analysis, and then multi-factor analysis was used to further find independent risk factors related to lung infection.

3.Results

3.1 Incidence and Mortality of SAP Patients' Lung Infection

Lung infection occurred in 52 of the 285 SAP patients, with an incidence rate of 18.25%. There were 11 deaths among patients with lung infection, with a mortality rate of 21.15%. Among the 233 SAP patients without lung infection, 24 died, with a mortality rate of 10.30%. The difference between the two groups was statistically significant ($P < 0.05$).

3.2 Distribution and Drug Sensitivity of Pathogenic Bacteria in SAP Patients' Lung Infection

A total of 56 pathogens were isolated from the sputum samples of 45 out of 52 patients with lung infections. One pathogen was found in 30 patients, and mixed infection of two or more pathogens was found in 15 patients (33.33%). Among them, gram-negative bacteria, gram-positive bacteria and fungi respectively accounted for 80.36% (45/56), 12.50% (7/56) and 7.14% (4/56). The common pathogens of gram-negative bacteria are Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Acinetobacter and Enterobacter cloacae in sequence; the pathogens of gram-positive bacteria are staphylococcus aureus and coagulase-negative staphylococci; fungal pathogens are Candida albicans and Candida glabrata. For details see Table 1.

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Table 1. Distribution and constituent ratio of pathogens of pulmonary infection in patients with severe acute pancreatitis (%)

Pathogens	Number of plants	Composition ratio
Gram-negative bacterium	45	80.36
Escherichia coli	14	25.00
Pseudomonas aeruginosa	11	19.64
Klebsiella pneumoniae	10	17.86
Acinetobacter	7	12.50
Enterobacter cloacae	2	3.75
Bacillus maltophilia	1	**1.79**
Gram-positive bacteria	7	12.5
Staphylococcus aureus	5	8.93
Coagulase-negative staphylococci	2	3.57
Fungi	4	7.14
Candida albicans	3	5.36
Candida smooth	1	**1.79**

The isolated common pathogens were tested for antibiotic sensitivity, and the results are shown in Table 2. Gram-negative bacteria are resistant to common antibiotics to varying degrees. Pseudomonas aeruginosa is the most resistant, showing a certain degree of resistance to imipenem.

Table 2. Resistant rates of major gram-negative bacteria to antimicrobial agents(%)

Antibacterial drugs	Escherichia coli (n=14)		Pseudomonas aeruginosa (n=11)		Klebsiella pneumoniae (n=10)	
	Number of plants	Resistance rate	Number of plants	Resistance rate	Number of plants	Resistance rate
Ampicillin	14	100.00	11	100.00	10	100.00
Piperacillin/tazobactam	3	21.43	7	63.64	5	50.00
Amikacin	4	28.57	7	63.64	6	60.00
Ciprofloxacin	9	64.29	10	90.90	7	70.00
Cefazolin	10	71.43	11	100.00	8	80.00
Ceftazidime	7	50.00	8	73.73	6	60.00
Cefoperazone/Subactam	2	14.29	6	54.55	4	40.00
Imipenem	0	0.00	5	45.45	2	20.00

3.3 Analysis of Risk Factors for Lung Infection in SAP Patients

In order to determine the risk factors of lung infection in SAP patients, we selected 16 relevant factors for statistical comparison and analysis between the control group and the case group. There were statistical differences in 7 variables, namely age, ventilator treatment, Ranson score at admission, surgical treatment, indwelling nasogastric tube for more than 10 days, urea nitrogen level at admission and albumin level at admission. The results are shown in Tables 3 and 4. In order to exclude relevant risk factors, variables were included in a multivariate logistic regression analysis, and three variables were determined to be independent risk factors for lung infection in SAP patients. The results are shown in Table 5, which are respectively age (OR 1.05, 95% CI 1.01 -1.09, p = 0.01), Ranson score (OR3.01, 95% CI 1.13-8.03, p = 0.03) and surgical treatment (OR4.27, 95% CI 1.03-17.65, p = 0.04).

Table 3. Univariate analysis of risk factors of pulmonary infection in patients with severe acute pancreatitis (quantitative variables)

	Infection group (n=52)		Control group (n=52)		t value	*P value*
	Average	SD	Average	SD		
Age (years)	50.98	14.62	41.38	14.13	3.403	0.00
BMI (kg/m2)	25.51	3.05	25.11	3.33	0.645	0.52
Ranson score (score)	4.35	0.68	3.75	0.65	4.550	0.00
Blood amylase (U/L)	780.77	327.11	762.88	366.25	0.263	0.79
urea nitrogen (mmol/L)	7.12	1.76	6.27	2.00	2.314	0.02
Albumin (g/L)	37.36	5.00	39.69	6.00	-2.151	0.03

Table 4. Risk factors and infection rates(%) of pulmonary infection in patients with severe acute pancreatitis (categorical variables)

	Factors	Number of cases investigated	Number of cases of infection	Infection rates	χ^2 value	*P value*
Gender	Male	59	31	52.54	0.35	0.69
	Female	45	21	46.67		
COPD	Yes	11	7	63.64	0.92	0.53
	No	93	45	48.39		
History of smoking	Yes	32	19	59.38	1.63	0.29
	No	72	33	45.83		
History of drinking	Yes	29	13	44.83	0.43	0.66
	No	75	37	46.67		
History of hypertension	Yes	19	12	63.16	1.61	0.31
	No	85	40	47.59		
Diabetes history	Yes	14	8	57.14	0.33	0.78
	No	90	44	48.89		
Ventilator therapy	Yes	31	21	67.74	5.56	0.03
	No	73	31	42.47		
Surgical treatment	Yes	21	17	80.95	10.08	0.00
	No	83	35	42.17		
Retention of gastric tube(d >10)	Yes	52	32	61.54	5.54	0.03
	No	52	20	38.46		
Hormone use	Yes	19	11	57.89	0.58	0.61
	No	85	41	48.24		

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Table 5. Logistic regression analysis of risk factors for pulmonary infection in patients with severe acute pancreatitis

	β	SE	Wald/χ^2	*p value*	OR	95%*CI*
Age	0.05	0.02	6.67	0.01	1.05	1.01-1.09
Ranson score	1.10	0.50	4.86	0.03	3.01	1.13-8.03
Surgical treatment	1.45	0.72	4.02	0.04	4.27	1.03-17.65

4. Discussion

SAP is a serious disease with high prevalence and mortality. It is prone to multiple organ complications, among which the incidence of pulmonary complications is as high as 68.1% [15]. Lung infection is the main pulmonary complication of SAP and an important cause of death in SAP patients. The incidence of lung infection in our group of cases was as high as 18.25%. The mortality rate of patients with lung infection was 21.15%, which was higher than that of the non-infected group. Therefore, active treatment and prevention of lung infection are beneficial to reduce the mortality of SAP.

Lung infections of SAP patients are mostly hospital-acquired. Empirical initial antibiotic treatment for hospital-acquired infections is the main factor determining the prognosis of patients. And bacterial resistance testing is an important basis for empirical initial antibiotic treatment. In etiology, the proportion of Gram-negative bacteria was relatively high, which was consistent with that of Chen Zhongjian[16]. This study has found that the bacterial spectrum of the case group has the following characteristics: ① The pathogenic bacteria are mainly gram-negative bacteria, and the infection of gram-negative bacteria may be related to endogenous infections such as bacterial translocation and inhalation of oropharyngeal secretions. ② The detection rate of multi-drug resistant bacteria is high. Also, the distribution ratio of Pseudomonas aeruginosa is high, showing strong antibiotic resistance. ③ The proportion of mixed infections is high, and about 1/3 of patients have two or more bacterial infections. SAP complicated by lung infection is prone to complications such as metabolic disorders and respiratory failure; the disease progresses fast with high mortality rate; there are a number of risk factors for multidrug-resistant bacteria infection with high infection rate. Considering the above points, it is appropriate to employ broad-spectrum antibiotic therapy, targeted at multi-drug resistant bacteria, for empirical initial antibiotic treatment. According to bacterial distribution characteristics and guidelines for hospital-acquired infection, antibiotics can be selected from third-generation or fourth-generation cephalosporins (cefoperazone, ceftazidime, cefepime) or β-lactams/β-lactamase inhibitors (cefoperazone/sulbactam, piperacillin/tazobactam). And if necessary, carbapenems (imipenem, meropenem) can be chosen.[17-18]

Prevention is the emphasis of hospital-acquired infection. Based on clinical experience and related literature reports, 16 possible risk factors were included in this study. Given the possible mutual influence among these risk factors, single factor analysis was followed by multi-factor analysis to screen independent risk factors. The study has found that age, Ranson score and surgical treatment are three independent risk factors for SAP complicated by lung infection. First, as the patient ages, his/her immune globulin level and cellular immunity decline, resulting in decreased systemic resistance to infection. In addition, elderly patients' capacity of sputum excretion weakens after operation. These systemic and local factors can make postoperative patients vulnerable to lung infections. Hence, elderly SAP patients should be the key population that needs to prevent lung infections. Second, Ranson score is a scoring standard that reflects the severity of pancreatitis recommended by most guidelines. The scoring system includes 5 clinical indicators at admission and 6 indicators in 48 hours. A score greater than 3 indicates severe pancreatitis, and the score is highly accurate in predicting organ failure and death. Our study has found that an increase in the Ranson score also means an increased risk of lung infection in SAP patients. Third, surgical debridement plays an important role in the treatment of SAP, but due to the patient's systemic inflammatory response syndrome and the body's poor state, there are various surgical complications and high mortality[19]. Abdominal incisions after debridement surgery can lead to difficulty in expectorating sputum and decreased breathing ability, which may give rise to lung infection. In recent years, minimally invasive debridement surgery of SAP has been valued. The progressive treatment of puncture, endoscopy, laparoscopy, and laparotomy can reduce postoperative complications and lower the lung infection rate from 50% to 27%[20].

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Experience of Nursing and Pipeline Maintenance before and after Implantation ECMO in Patients with Acute Respiratory Distress Syndrome (A Case)

Fang Xie* **Jiarong Zhang** **Ming Zhang**

Xinjiang Uygur Autonomous Region People's Hospital, Urumqi, Xinjiang, 830000, China

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ABSTRACT

Objective: experience in post-implantation care and pipeline maintenance in patients with acute respiratory distress syndrome. **Methods:**2020Admitted on 27 July1 Cases of severe pneumonia were transferred to severe ventilator on August 6 and to critical ECMO on August 10. **Results:** after active treatment, especially for the late stage of ECMO pipeline, the vital signs of the patients improved obviously and the condition gradually stabilized. **Conclusion:** The nursing care before and after the establishment of ECMO pipeline in patients with acute respiratory distress syndrome, the matters needing attention and the working experience after the establishment, It can provide a reference for the treatment of severe infectious diseases in the future.

1. Introduction

Acute respiratory distress syndrome (ARDS) is an acute diffuse inflammatory lung injury that can lead to increased pulmonary vascular permeability, increased lung weight, and reduced lung tissue involved in ventilation. it is characterized by hypoxemia, decreased lung radiometry, intrapulmonary shunt, increased physiologically ineffective lumen, and decreased lung compliance. ARDS is one of the most common causes of acute respiratory failure.

Extracorporeal membrane oxygenation (Extracorporeal Membrane Oxyenation, ECMO) is one of the life support systems in vitro. It is used to oxygenate venous blood by artificial lung and then inject carbon dioxide into human body[1]ECMO can replace cardiopulmonary function.

Long patient treatment time window, for the patient's follow-up treatment to win valuable time. Severe NCP patients with effective ECMO life support, can win treatment time for patients. The nursing report of a critical NCP patient combined with ECMO treatment is as follows:

2. Clinical Data

Patients, Women, 50. Fever 2 d, Dyspnea 1 d, Admitted on 27 July 2020, 37.7℃ after admission, IgG, of virus antibodies IgM positive, Nucleic acid test positive, Lung CT examination suggests multiple glazing chang-

**Corresponding Author:*
Fang Xie,
Xinjiang Uygur Autonomous Region People's Hospital, Urumqi, Xinjiang, 830000, China;
E-mail: 425855126@qq.com.

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es in both lungs.PO2 is 47.6 mmhg, after antiviral and symptomatic treatment, the PO2 is still 50 mmhg body temperature is 38 degrees, so invasive mechanical ventilation. Eleven days later, Dyspnea aggravated lung CT massive consolidation in both lower lungs, The patient was in high oxygen condition, The oxygen saturation can be maintained at 92%, FiO2 70 mmhg more than six hours, After unanimous discussion, the standard of ECMO adjuvant therapy was met. The patient successfully underwent jugular and femoral vein catheterization on August 10, ECMO, connection Adopt VV mode. The operation was smooth, the patient's oxygen saturation rose rapidly to 100.

3. Care before ECMO Line Implantation

(1) Standard operating procedures (Standard Operating Procedure SOP) were introduced ECMO, because of the critical condition of the patients, long treatment time, and the coexistence of multiple pipelines, the ECMO nursing process is complex, many problems, difficult, at the same time less nursing experience, domestic and foreign related nursing norms, lack of procedures and other problems. Therefore, the establishment of detailed SOP ECMO adequate preparation before implantation is particularly critical.

(2) Set up a ECMO medical treatment team composed of respiratory experts, cardiologists, anesthesiologists, cardiopulmonary bypass doctors, cardiac ultrasound doctors, hemodialysis doctors and nursing staff. In the course of treatment, the medical staff and instruments are clearly positioned and divided. It greatly improves the organization and effectiveness of rescue.

(3) ECMO pre-punching of pipeline ECMO pre-punching of pipeline are speed-limiting steps and key to ECMO normal operation. Through the flow design of ECMO pipeline pre-flushing in SOP, the concrete operation steps are refined. Before starting to set the pipe, the nurse needs to complete the pipeline pre-flushing, which wins the time for the successful rescue.

(4) Pre-production ECMO patient care plan sheet. ECMO the preparation and use of patient care plan, omissions or errors can be avoided. First, the responsible nurses check the contents of the nursing plan in the plan form (see Table 1) according to the patient's condition, and fill in the start and modification time. Then each class nurse carries out the observation and nursing of the patient according to the plan. In case of abnormal situation, the nurse notifies the doctor in time. According to the implementation of nursing plan, the head nurse arranges the nurse's work as a whole to improve the efficiency of ECMO treatment.

Table 1. ECMO Pipeline Management Plan

No. No. No. No. No. No. No. No

Content of the plan	Start time	Modification time
□ incision bleeding observation		
□ piping fixed		
□ speed, flow, water temperature		
□ oxygen concentration and gas flow rate (L/min)		
□ anticoagulant monitoring		
□ Heparin Application		
□ACT monitoring Q2h (2 mL blood samples)		
□APTT monitoring Q4□APTT 6 h		
□ limb ischemia		
□ dorsal artery pulsation		
□ lower extremity skin colour, temperature and leg circumference		
Signature of nurse		
Signature and Time of Head Nurse		

(5) ECMO Alarm, troubleshooting and timely identification and handling ensure the normal operation of the ECMO and patient safety[2]. The ECMO team summarized the common alerts as follows:

① Abnormal flow monitoring
② Abnormal pump operation
③ Abnormal pipe jitter

Common failures are:

① Centrifugal pump fault
② Thrombosis in centrifugal pump
③ Intrapulmonary thrombosis
④ Broken pipe/joint, loose
⑤ Water tank temperature anomaly

4. Care after ECMO Line Implantation

4.1 Pipeline Care

(1) ECMO pipeline management can be carried out by nurses, cardiopulmonary bypass perfusion division, respiratory therapists and other personnel, can be full-time management, but also cross-management.

(2) Fixed ECMO pipeline position, closely observe and protect arteriovenous intubation and pipeline, avoid pulling, discounting, displacement, ensure the normal operation of the ECMO.

(3) Pay attention to intubation (puncture) position bleeding.

Do not mop the floor 3.1.4 the pipe is too long.

(4) Do not inject drugs or draw blood in the ECMO system.

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4.2 Basic Care for ECMO Patients

(1) The patient's comfortable posture and rest, quiet environment, reduce pain and anxiety, prevent restlessness.

(2) A certain period of time to maintain the patient's awake and normal reaction state.

(3) Prevent complications, especially bleeding, infection, pressure sores, etc.

(4) Respiratory care: regular clearance of respiratory secretions, regular oral care, maintenance of respiratory safety.

(5) In the nursing ECMO patients have greater movements such as changing posture, wipe clothes and pat back need more than 2 nursing staff cooperation, pay attention to the protection of intubation and pipe, to prevent pipe discount or patients restless pipe.

(6) Due to heparinization, avoid the establishment of new venous channels, avoid subcutaneous, intramuscular injection.

(7) ECMO skin care:

① Change of patient's posture (1-2 hours), especially protect the skin of posterior head, heel and sacrococcygeal, reduce edema and promote peripheral circulation.

② Venous access puncture dressing to keep clean.

③ Arteriovenous intubation surface regular inspection, disinfection, avoid infection, reduce bleeding.

④ Avoid new venous access.

⑤ Avoid damage to oral, respiratory and esophageal mucosa.

4.3 Monitoring of Care

(1) Important indicators and parameters related to ECMO are regularly recorded, such as turnover time, urine volume and color, body temperature, ACT value, blood oxygen saturation, hemodynamic parameters, lower extremity blood flow on the side of femoral arteriovenous catheterization, Skin color and temperature at extremities.

(2) Regularly monitor ACT and coagulation indicators, HCT、 platelet count, arterial blood gas, electrolytes, and check whenever necessary.

(3) Simple ECMO equipment observation: plasma leakage of membrane lung, color change of circulating pipe, abnormal jitter of pipe, alarm of machine, alarm of anaerobic, etc.

(4) Report the abnormal situation to the ward supervisor and the perfusion doctor on duty in time.

(5) Monitoring and nursing of complications.

① Bleeding: common bleeding sites include intubation sites, surgical incisions, etc.

② Embolism: pay attention to observe whether the affected limb is stiff, pale and swollen; dorsal foot artery pulsation; foot temperature. If there is any abnormality, report to the doctor in time.

③ Hemolysis: check the urine color and monitor the plasma free hemoglobin concentration every 4-6h, if the naked eye hematuria or dark brown urine should immediately notify the doctor; if there is hemolysis should immediately replace the oxygenator and pipeline, Plasma exchange is feasible in severe hemolysis.

4.4 ECMO Notes

(1) Maintain ACT ＞ 150-180s, hourly monitoring ACT, ACT stable every 2-3 h monitoring.

(2) Heparin 125-200 U /h (1 12500 U heparin with 500 ml saline)

(3) Observation of the supply vessel and drainage tube, the excessive jitter of the drainage tube indicates distortion or insufficient capacity.

(4) Pay attention to observe oxygen supply.

(5) Centrifugal pump abnormal situation, first clamp centrifugal pump outlet (A), pump speed down to 1500 rpm after clamping centrifugal pump inlet end (V).

(6) Flow calibration, flow sensor reapply coupling agent, arteriovenous clamping, calibration "0".

When 3.4.7 do ACT, use a common syringe.

4. summary

ECMO is more and more widely used in patients with severe pneumonia. Fine and efficient nursing cooperation is the key to ensure ECMO diagnosis and treatment results[3]. However ECMO in the course of treatment, there will also be a variety of complications, once occurred, will lead to a sharp deterioration of the patient's condition, mortality significantly increased. Therefore, the medical staff should master the ECMO operation technology skillfully, cooperate skillfully, observe the various parameters of the machine closely during the operation of the machine, observe the change of the patient's condition, and have the ability to find the change of the condition and give timely and emergency treatment at the same time. It is very important to strengthen personal protection and block the iatrogenic transmission of the virus. Make emergency plan in advance to ensure the normal and effective operation of the machine during treatment, avoid the occurrence of adverse events as far as possible, and pay attention to other kinds of management nursing. Close monitoring and skilled and meticulous nursing are important guarantees for ECMO successful rescue of patients with severe pneumonia.

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Research and Prospect of Quality Development of Pharmaceutical Technology in Drug Research and Development

Bei Zhang[1*] Zongchao Ning [2]

1.Beijing Global Pharmaceutical Research Co., Ltd., Beijing, 100022, China
2.Beijing Inno-tech Pharmaceutical Technology Co., Ltd., Beijing, 100023, China

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ABSTRACT

Pharmaceutical technology is an indispensable and important link in drug research and development, which plays a key role in drug research and development quality. In the background of science and technology development, pharmaceutical technology has been greatly developed, but also to promote the quality of drug research and development, to provide more guarantee for people's health. In the new era, how to achieve pharmaceutical technology innovation, so as to further improve the quality of drug research and development, is an important research topic in the current related industries. This paper mainly revolves around quality of pharmaceutical technology development of a series of exploration, in the traditional drug development based on a better control of drug quality, the future of smart pharmaceutical green pharmaceutical development direction, aims to further enhance the pharmaceutical technology, promote the quality of research and development to promote the comprehensive, promote the steady development of the pharmaceutical industry as a whole.

1. Introduction

With the gradual development of science and technology, more and more new technologies and new processes have been widely used in drug research and development, which further promotes the optimization and innovation of pharmaceutical process and injects new vitality into the stable development of the entire pharmaceutical industry. Strengthening the promotion and development of pharmaceutical technology can steadily improve the quality of drug research and development, effectively control the drug cost and price, and promote the double improvement of economic benefits and social benefits. Therefore, the related industries should strengthen the in-depth research of pharmaceutical process, promote the innovation of process, and create a broader space for the development of pharmaceutical process.

2. Importance

2.1 Promoting the Development Level of the Pharmaceutical Industry

With the gradual development of science and technology, drug research and development technology are improving day by day, which has produced great social benefits and brought great guarantee for human health. Different from other industries, the development of the

**Corresponding Author:*
Bei Zhang,
Beijing Global Pharmaceutical Research Co., Ltd., Beijing, 100022, China;
E-mail: zhbei_2004@163.com.

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medical industry is directly related to the life, health and safety of human beings, so as to ensure that people's body can get effective treatment. Through drug research and development, pharmaceutical technology development and quality improvement, to achieve reasonable control of drug prices. Through the reasonable control of drug prices, relieve the life pressure of patients' families, and truly take responsibility for human life and health.

2.2 Providing Better Drug Services

Drug development has certain risks, and the drug market access threshold is high, especially in the stage of new drug promotion, which makes pharmaceutical enterprises bear great market risks. Only on the basis of ensuring the efficacy of drugs, the pharmaceutical process is optimized and reformed, and the production cost is reasonably controlled, can the economic benefits of pharmaceutical enterprises be guaranteed, and better drug services can be provided for people.[1] Therefore, it is necessary to carry out comprehensive reform and innovation on drug research and development and pharmaceutical process, promote the development level of pharmaceutical process, in order to truly guarantee the legitimate use of pharmaceutical enterprises, and lay the foundation for the long-term development of pharmaceutical enterprises. However, in this process, pharmaceutical enterprises should correctly realize their social responsibilities, strictly check pharmaceutical materials and equipment, and avoid problems such as low-quality drugs or fake drugs.

3. Current Development Status of Traditional Drug R&D and Pharmaceutical Process Quality

3.1 Preparation Principle

The quality of raw materials and equipment is an important material basis for improving pharmaceutical quality. Many drug quality problems are caused by problems with raw materials and equipment. Therefore, the quality of pharmaceutical raw materials should be strictly checked. In order to reduce the cost, some pharmaceutical companies buy low-quality raw materials, which not only reduces the efficacy, but also may seriously threaten people's lives and health. In addition, it is necessary to pay attention to strict quality storage and maintenance of pharmaceutical equipment. In the purchase of equipment, to choose high-quality pharmaceutical equipment, in order to ensure that the quality of the drug guidance out of the standard. When many pharmaceutical enterprises purchase equipment, they do not pay attention to the detailed inspection of the equipment, resulting in the purchase of equipment can not meet the corresponding quality standards. And in the application of equipment, often in the production of different kinds of drugs, the use of the same equipment, cleaning is not sufficient, resulting in a great impact on the performance of the drug. In addition, many pharmaceutical enterprises do not pay attention to the maintenance and maintenance of equipment, after use, there is no comprehensive equipment disinfection, resulting in equipment rust phenomenon; In addition, the equipment is not cleaned in time, resulting in the residual drug residue in the equipment, once mixed into other drugs, it is easy to have a serious impact on the drug performance.[2]

3.2 Insufficient Personnel Quality

Pharmaceutical personnel are the direct operators of pharmaceutical technology, so their comprehensive quality has a direct impact on the quality of drug development. In the actual pharmaceutical process, some positions of staff lack of responsibility, the work of enterprise is not high, often muddle along, cannot be fully engaged in the pharmaceutical work, it is easy to cause human error, resulting in problems in the pharmaceutical process; In addition, some companies don't pay attention to the professional training of comprehensive pharmaceutical personnel, resulting in a lack of professional knowledge and professional skill, pharmaceutical personnel seriously affect the normative use of pharmaceutical process, lead to promote the pharmaceutical effects, even drug quality problems, etc., for the long-term development of the pharmaceutical industry is very adverse.[3]

4. Drug Research and Development Pharmaceutical Process from Where to Improve the Quality

4.1 Focusing on the Preparation Principle of Drug Research and Development Technology

Drug research and development and production is a fine production activity, which requires a high level of research and development technology and preparation principle. Different preparation methods and principles will obtain different research and development effects, which may be positive or negative. Therefore, in the specific implementation of the pharmaceutical process,

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different preparation principles should be comprehensively analyzed to give full play to the advantages of each preparation principle and ensure the safety and effectiveness of the application of pharmaceutical process to the greatest extent. In addition, the latest science and technology and biotechnology should be combined to optimize and upgrade the preparation scheme, so as to reduce the environmental pollution damage caused by the pharmaceutical process as much as possible.[4]

4.2 Improving the Pharmaceutical Process from the Perspective of Quality Control of Raw Materials and Equipment

Pharmaceutical raw materials and equipment are important material guarantee to ensure the quality of drug research and development. The quality of raw materials of drugs should be strictly controlled to ensure compliance with the standard requirements. Only in this way can the quality of drugs be guaranteed. Once there are quality problems in raw materials, it will lead to the inefficiency of the whole pharmaceutical engineering. In addition, strict quality control should be carried out on pharmaceutical equipment, and timely replacement and upgrading of equipment should be carried out to ensure compliance with pharmaceutical requirements. In addition, we should pay attention to the scientific and reasonable daily management of pharmaceutical equipment, timely cleaning and disinfection after the completion of use, to prepare for the next pharmaceutical application, to prevent rust and cross-contamination of drugs.

4.3 Optimize the Pharmaceutical Process from The Aspect of Improving the Quality of Pharmaceutical Personnel

Pharmaceutical personnel are the direct operators of pharmaceutical technology, their comprehensive quality level has a key impact on pharmaceutical quality. At present, the responsibility of some pharmaceutical personnel is not strong, lack of professional pharmaceutical skills, resulting in the overall pharmaceutical quality can not be effectively improved. Therefore, it is necessary to strengthen the supervision and management of pharmaceutical personnel, improve the quality level of pharmaceutical personnel, combine the actual situation, regularly carry out professional skills training, such as inviting experts in relevant fields to give lectures, strengthen the sense of responsibility, make up for the lack of professional knowledge; In addition, centralized skill training should be actively carried out to improve the skill level of pharmaceutical personnel and ensure the normative operation of pharmaceutical process. Establish a scientific and reasonable assessment mechanism to strengthen the participation enthusiasm of pharmaceutical personnel; It is necessary to create good conditions to attract more high-quality pharmaceutical personnel to participate in the pharmaceutical industry, optimize the talent structure, strengthen work innovation, and inject new vitality into the quality development of pharmaceutical process.[5]

4.4 Strengthening Supervision and Administration

National regulatory authorities should give full play to their own functions, carry out comprehensive quality supervision and management of all links of the pharmaceutical process, promote the standardization and standard of the pharmaceutical process, so as to provide guarantee for the improvement of pharmaceutical quality. First, to the pharmaceutical raw materials and production equipment, such as the implementation of comprehensive inspection and testing, especially to the quality of raw materials and equipment disinfection link for strict supervision, to ensure the standardization of the work process; Second, to implement a comprehensive supervision of the pharmaceutical process, to ensure the pharmaceutical personnel's pharmaceutical qualifications, to have professional skills, to ensure the standardization of pharmaceutical operations, for illegal operations to give a severe warning; Third, in the pharmaceutical end link, we should pay attention to the sampling test of all drugs, to ensure that the quality of drugs meets the standard requirements, and to review its side effects. Only after all drugs meet the standard, can we be allowed to leave the factory for sale.[6]

5. The Future Development Direction and Expectation of New Pharmaceutical Technology

5.1 Internal Improvement of Chemical Pharmaceutical Process

With the gradual development of science and technology, chemical pharmaceutical technology has been rapidly developed and widely used. Under the background of science and technology development, continuous optimization and improvement of chemical pharmaceutical process should be carried out according to the actual needs of current social development, so as to promote the innovation of pharmaceutical pro-

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cess. Practice has proved that through the internal improvement and innovation of pharmaceutical process, not only can greatly reduce the cost of drug R&D and manufacturing, but also can promote the efficiency of pharmaceutical process, to meet the new needs of the current society for drug R&D. With the gradual development of the society, the realization of the internal improvement of the pharmaceutical process has gradually become an important development trend of the pharmaceutical industry, and with the continuous development of science and technology, its improvement ideas and approaches will be more and more broad, for the development of the pharmaceutical process to create a better prospect.[7]Recently, China has introduced a membrane filtration technology, which is environmentally friendly and low energy consumption technology, and effectively reduces the pollution problem in the chemical and pharmaceutical process. However, the current production equipment has become a major problem in the development of drug research and development and pharmaceutical technology, because part of the equipment is difficult to meet the pharmaceutical standards. Therefore, it is necessary to actively introduce advanced production equipment to create conditions for internal process improvement. It can be seen that the internal improvement of chemical pharmaceutical process effectively improves the quality of pharmaceutical process.

5.2 Gradual Development of Biotechnology and Pharmaceuticals

With the development of biotechnology research, it has gradually realized the comprehensive combination with the pharmaceutical field, and further expanded the research and development way and space in the pharmaceutical field. In the new era, people pay more and more attention to the development of biotechnology, and through in-depth research and development, biotechnology has provided a great help and convenience to the development of human society, but also provides a strong support to the pharmaceutical field. Although the biological process is developed from the traditional biological pharmaceutical technology, there are many differences with the traditional pharmaceutical methods, which is both an inheritance and an innovation, and has made a great contribution to the development of the quality of the pharmaceutical process. At present, countries all over the world have strengthened the research and development of biotechnology, and further deepened the integration of biotechnology and pharmaceutical technology.[8]

5.3 Green Pharmaceutical Technology Is Gradually Flourishing

In the new era, with the gradual deepening of the concept of green environmental protection, the application of drug research and development and pharmaceutical technology has also gradually reflected the need for green environmental protection. The development of green technology has promoted the healthy and positive development direction of the pharmaceutical industry. The intelligent preparation process has realized the gradual transformation from chemical pharmaceutical to green pharmaceutical, reduced pollution and energy consumption, and truly reflected the healthy development direction of the quality of pharmaceutical technology of drug research and development.

6. Conclusion

Study of pharmaceutical research process quality need long-term persistence and efforts, relevant personnel to related problems to conduct a comprehensive analysis of the pharmaceutical technology, and pharmaceutical process each link to conduct a comprehensive innovation and optimization, especially the pharmaceutical raw materials, equipment and R&D staff strict quality control, create good basic conditions for the development of pharmaceutical technology. In addition, it is necessary to combine the development of science and technology, promote the internal improvement of pharmaceutical process, strengthen the full integration with biotechnology, and develop green pharmaceuticals such as intelligent pharmaceuticals in the future, so as to create new development directions for the development of pharmaceutical process, expand development space, and provide a solid foundation for improving the quality of drug research and development. Through the research on the development of drug research and development and pharmaceutical technology, it can effectively improve the pharmaceutical efficiency, reduce the cost, reduce the price of drugs, produce good social benefits, but also provide guarantee for the comprehensive benefits of pharmaceutical enterprises.

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