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Influence of Nursing Operation on Blood Test Results and Its Countermeasures

Norbu Drolma[1,*], Yuxin Yang[2]

[1]Department of Laboratory Medicine, People's Hospital of Bayi District, Nyingchi, China
[2]Bayi District Center for Disease Control and Prevention, Nyingchi City Lab, Nyingchi, China
[*]Corresponding author: 2356427520@qq.com

Abstract: *To analyze the influence of nursing operation on blood test results and the countermeasures, so as to make a positive impact on the accuracy of clinical blood test results. We selected 340 blood samples which were examined in our hospital from January 2024 to June 2024 and the results were problematic. Based on the standard blood quality, we detected and analyzed the unqualified blood samples in clinical examination, found out the reasons for the quality change of blood test results, recorded the factors that affected the quality of blood samples, and analyzed the composition of problems in various operation links of nurses, including blood placement, blood vessel selection, blood injection into test tubes, disinfection, blood collection sequence. The highest factor affecting the quality of blood samples was nursing (284 cases, accounting for 83.53%), followed by patients (278 cases, accounting for 81.76%), doctors (31 cases, accounting for 9.12%) and examiners (20 cases, accounting for 5.88%). The highest component of problems in various operation links of nurses is blood collection sequence (98 cases, accounting for 34.51%), followed by blood collection time (76 cases, accounting for 26.76%), disinfection (34 cases, accounting for 11.97%), blood injection into test tubes (29 cases, accounting for 10.21%), Then blood vessel selection, 26 cases, accounting for 9.15%, and finally blood placement, 21 cases, accounting for 7.39%. One of the main reasons for the errors in blood test results is improper nursing, insufficient preparation before operation, and nonstandard blood collection sequence and time, which are all part of the nursing reasons. Therefore, the hospital should strengthen the training of nursing staff and standardize the blood collection standards and procedures of nursing staff, reduce the errors in blood sample test results, and ensure the patients in the later treatment.*

Keywords: *nursing operation; Blood test results; Influencing factors; countermeasure analysis*

1. Introduction

Clinical blood biochemical tests have important application value in health assessment, disease diagnosis and disease detection. Through the detection of various chemical components in blood, combined with qualitative and quantitative analysis results, the health status of the subjects is judged. The occurrence and development of various diseases will lead to abnormal changes in the chemical composition of blood. After clinical blood biochemical tests, the test results suggest that a certain blood biochemical index is beyond or below the normal range, which can be used as an important basis for judging the occurrence of related diseases[1-2].After the diagnosis of the disease, take the clinical blood biochemical test results as a reference, and make corresponding adjustments for the treatment plan.

The most common blood samples in medicine are mainly divided into plasma, serum, whole blood, concentrated blood cell components or separation of these four kinds. Before taking blood, it will lead to errors between the blood test results and the real results, and even serious hemolysis of the samples[3-4]. The follow-up treatment results of patients will be affected by the test results of blood samples, so it is very important to ensure that the errors are reduced during the test. Therefore, this time, the reasons for the impact on the quality of blood samples are analyzed and discussed in depth. Now it is reported as follows.

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2. Data and Methods

2.1 General information

340 blood samples were selected from January 2024 to June 2024, and the results were problematic. These samples were from 187 male patients, accounting for 55.00%, and 153 female patients, accounting for 45.00%, aged from 22 to 63, with an average of (31.67±13.28) years. This study has been approved by the Ethics Committee, and all the patients involved in this experiment have informed and agreed to the content of this experiment.

2.2 Methods

Taking the standard blood quality as the standard, we detected and analyzed the unqualified blood samples in clinical examination, found out the reasons for the quality change of blood test results, recorded the factors that affected the quality of blood samples, and analyzed the composition of problems in various operation links of nurses, including blood placement, blood vessel selection, blood injection into test tubes, disinfection, blood collection sequence and blood collection time.

2.3 Statistical methods

All the collected values are entered into SPSS25.0 software for statistical analysis. The counting data are recorded in the form of examples and percentages, and analyzed by $\chi 2$ test, and the measuring data are recorded in the form of mean and standard deviation. After analysis by T test, it is considered that there are differences at the statistical level with $P < 0.05$.

3. Results

3.1 Factors affecting the quality of blood samples

The highest factor affecting the quality of blood samples is nursing (284 cases, accounting for 83.53%), followed by patients (278 cases, accounting for 81.76%), doctors (31 cases, accounting for 9.12%) and examiners (20 cases, accounting for 5.88%).As shown in table 1.

Table 1: Factors affecting the quality of blood samples

	Number of cases	constituent ratio
Doctor factor	31	9.12%
Nursing factors	284	83.53%
Personnel factor for inspection	20	5.88%
Patient factors	278	81.76%
Total	340	100.00%

3.2 The composition of problems in each operation link of nursing staff

The highest component of problems in various operation links of nurses is blood collection sequence (98 cases, accounting for 34.51%), followed by blood collection time (76 cases, accounting for 26.76%), disinfection (34 cases, accounting for 11.97%), blood injection into test tubes (29 cases, accounting for 10.21%), and blood vessel selection (26 cases, accounting for). As shown in table 2.

Table 2: Composition of problems in each operation link of nursing staff

	Number of cases	constituent ratio
Blood placement	21	7.39%
Vascular selection	26	9.15%
Blood injection test tube	29	10.21%
Disinfect	34	11.97%
Blood sampling sequence	98	34.51%
Blood collection time	76	26.76%
Total	284	100.00%

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4. Discussion

The most common blood samples in medicine are mainly divided into plasma, serum, whole blood (mainly including venous whole blood, capillary whole blood and arterial whole blood), concentrated blood cell components or separated four kinds. The test results of blood samples have a great influence on the nursing operation, and the nonstandard and inappropriate nursing operation process will lead to great errors in the test results of blood samples. According to the data, the results show that when there are quality problems in blood samples, most of the reasons are caused by improper nursing, because the nursing staff did not follow the standardized operation flow and standard operation behavior during the operation, which led to problems in blood samples[5-6].Failure to prepare the relevant items needed for blood collection before blood collection will lead to the error between the blood test results and the real results, and even serious sample hemolysis may occur[7-8].For the time of blood collection, the placement of blood and the choice of blood vessels, the test results of blood samples will be biased. Therefore, to avoid blood quality problems in the process of taking blood, we should strictly abide by the standardized testing process and accurately record the blood collection time, so that the blood collection results will be more accurate[9].Collecting blood samples is a basic nursing operation technology. The quality of blood collection will cause the deviation of test results, affect the quality of medical care, and lead to mistakes in diagnosis and treatment, which will not only increase the cost of patients, but also cause medical disputes. Therefore, the mistakes in the process of collecting blood samples should be paid attention to by nurses.

This study points out that the main problems in the operation of nursing staff are blood placement, blood vessel selection, blood injection into test tubes, disinfection, blood collection sequence and blood collection time, and the nursing factor is the highest factor affecting the quality of blood samples, so the countermeasures are as follows:

Master the correct method of taking samples: ①Patient's position: When the human body is in different positions, the laboratory test data of blood samples in the same part are very different. Because the body position affects the distribution of water in blood vessels, it is best to take a sitting position when taking blood.②Blood collection site: The median elbow vein or basilic vein is commonly used in clinical blood collection site, and the external jugular vein or femoral vein can be used in infants. You can't choose a vein that is too thin, otherwise the blood volume will be insufficient, leading to hemolysis. When the patient is intravenous infusion of liquid medicine, it is not allowed to take blood for electrolyte, blood sugar, blood routine, renal function and other tests. When it is used for blood gas analysis, it is necessary to take blood from the artery; ③Prevention of hemolysis: the preventive measures to prevent hemolysis of the specimen should be dried at the venipuncture site, and then the needle should be inserted; Avoid using unqualified blood drawing instruments and use excessively thin needles; Don't suck too hard or too fast. After drawing blood, first remove the needle and slowly inject blood along the wall of the test tube. Do not take blood from the hematoma; Do not stir the specimen. If there is anticoagulant, gently and fully mix it[10].④Correct application of tourniquet: The use time of tourniquet is generally less than 1 minute. Blood sampling with tourniquet can increase blood potassium. When measuring lactic acid, pyruvic acid and blood ammonia, blood should be drawn without a tourniquet as far as possible. When necessary, the needle should be inserted into the blood vessel first, then the tourniquet should be loosened, and then blood should be drawn after waiting for several minutes. Especially in blood gas analysis, tourniquets should not be used.

Mastering the collection time of samples: the ideal time for collecting blood samples is 7: 00 ~ 8: 00 in the morning, and blood culture samples should be collected at the early stage of fever or at the peak of fever. The collection time of re-inspection samples should be selected as far as possible at the same time as the last inspection.

Hold and deliver the specimen correctly: ① accurate marking: nurses should see the examination items clearly when executing the doctor's advice, and the marking is accurate and complete, with the patient's name, medical record number, sickroom bed number and specimen collection time; ②Timely submission for inspection: the time of storing the specimen has a direct impact on the accuracy of the test results, for example, blood sugar can be reduced by 6% ~ 10% per hour; In the hot summer, the deviation of the results is even greater; Blood potassium can be significantly increased with the extension of storage time. After collection, the specimen should be sent to the inspection room quickly to prevent the degradation of some components in the specimen or the contamination of the specimen[11-12].

Nurses should supplement the related knowledge of inspection: ①Strengthen the study of theory

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and practice: constantly improve the shortcomings in the work, abandon the idea of attaching importance to clinical nursing knowledge and ignoring inspection common sense, and always think that learning nursing does not need to know clinical, diagnostic and inspection knowledge, which is precisely the hidden danger that causes various medical disputes and accidents, and nurses should improve the importance and reliability of specimen collection.②Improve the knowledge and skills of nurses' specimen collection: The nursing department communicates and coordinates with the clinical laboratory regularly. The basic requirements, influencing factors, blood collection name, blood collection volume, required test tubes and matters needing attention of routine, special and newly developed examination items are compiled into tables for nurses' reference. In view of the problems existing in the process of specimen collection, such as irregular operation and unskilled technology, we arranged experienced teaching nurses to train young nurses in technical operation according to their own reality[13].

At the same time, nurses should correctly guide patients to get ready: ①Make clear the time and content of fasting: Experiments show that in the 21 analysis of routine biochemical indexes, there are 5 obvious changes in postprandial concentration, among which the increase of blood sugar and triglyceride is the most prominent, which will increase by 9.9% and 24.0% respectively. However, fasting for more than 16 hours will reduce the contents of protein, complement C, transferrin and glucose in serum and increase bilirubin. Therefore, nurses should tell patients clearly about fasting, water prohibition, medication, time (10 ~ 12 hours) and fasting before taking all kinds of test specimens to avoid errors caused by diet.②Take blood samples after proper rest: Outpatients who take blood often come from outside the hospital in a hurry, which may lead to the increase of lactic acid, pyruvic acid and enzymes, and the increase of potassium, sodium, calcium, alkaline phosphatase, albumin, sugar, uric acid and urea can be more than doubled during strenuous exercise. Therefore, avoid strenuous exercise before specimen collection;③Avoid mental interference and eliminate nervousness: When people are nervous and excited, their serum cholesterol, blood sugar and red blood cell count will also increase. Under the stimulation and stress of fear, anger and pain, the catecholamine in their blood will increase significantly. In the preparation before blood collection, psychological communication method should be used to eliminate patients' nervousness and fear.

5. Conclusion

One of the main reasons for the error of blood sample results is improper nursing, insufficient preparation before operation and nonstandard blood collection sequence and time, etc. All these reasons are part of nursing reasons, so hospitals should strengthen the training of nursing staff and standardize the blood collection standards and procedures of nursing staff, reduce the error of blood sample test results, and ensure the patients in the later treatment.

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