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# Analysis of the Effectiveness and Detection Rate of Urine Occult Blood Test in the Diagnosis of Urinary System Diseases

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**Abstract:** *Objective:* To analyze the application effect and detection rate of urine occult blood test in the diagnosis of urinary system diseases. *Methods:* 80 patients with definite diagnoses of urinary system diseases admitted from February 2022 to February 2023 were selected. Their urine samples were collected, urine sediment occult blood test and urinalysis were performed on each urine sample. The test results obtained from the two methods and their turnaround time were compared. *Results:* For the positive detection rates of white blood cells, red blood cells, proteins, and casts in the urine samples, there was no significant difference between the two methods ($P > 0.05$). In addition, there was no significant difference in the detection rates of various urinary system diseases between the two methods ($P > 0.05$). Urinalysis has a significantly shorter turnaround time compared to urine sediment occult blood test ($P < 0.05$). *Conclusion:* The urine occult blood test has a high detection rate in diagnosing urinary system diseases, with satisfactory application effect.

**Keywords:** Urinary system diseases; Urine occult blood test; Detection rate

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## 1. Introduction

Urinary system diseases have a high clinical incidence, including vaginitis, prostatitis, bladder stones, kidney stones, glomerulopathy, etc. The incidence rate has increased recently [1], seriously affecting patients' daily life and work. It may also lead to other diseases, increase treatment difficulty, and even endanger life. Therefore, it is necessary to establish a definite diagnosis through relevant examinations before adopting targeted treatment plans. In recent years, the continuous improvement of medical testing technology has greatly improved the detection rate of clinical diseases, especially the popularization of automated instruments, reducing the application rate of urine occult blood testing and other methods [2]. This study analyzes the application effect and detection rate of urine occult blood testing in the diagnosis of urinary system diseases.

## 2. General information and methods

### 2.1. General information

From February 2022 to February 2023, 80 patients with urinary system diseases were selected as the subjects of this study including 49 males and 31 females, aged 20 to 74 years old, with an average age of 46.39 ± 9.16 years. There were 33 cases of acute nephritic syndrome, 20 cases of kidney stones, 19 cases of glomerulopathy, and 8 cases of renal tumors.

Inclusion criteria included patients with discomfort symptoms related to the urinary system at the time of treatment; patients with relevant test indications; patients with normal audio and visual functions; and patients with complete clinical data and informed consent.

Exclusion criteria were patients with communication disorders; patients with other severe diseases; and patients in pregnancy or lactation.

### 2.2. Methods

Firstly, midstream urine was collected from the patients. The patients were instructed to fast and stop taking all medications before the collection. Before urine collection, the urethral opening was cleaned. A disposable urine cup was used to collect about 30 ml of midstream urine to reduce contamination.

Secondly, the urine samples were sent for testing within 2 hours after collection to prevent cell lysis and bilirubin changes that may interfere with the test results.

Lastly, urine sediment occult blood test and urinalysis were performed for each urine sample. 10 ml of urine sample was put into a test tube, followed by centrifugation and standing for 15 minutes. After discarding the supernatant, the urine sediment was resuspended by shaking and 0.3 ml was placed on a slide for microscopic examination. One drop of sulfosalicylic acid ethanol was added to the glass slide and the microscopic results were accurately recorded. Subsequently, urinalysis was performed using the urine test strip provided by the urine analyzer. The test strip was immersed in the urine sample and placed horizontally on a paper towel to remove excess urine. It was then inserted into the urine analyzer for analysis.

### 2.3. Observation indicators

The positive detection rates of white blood cells, red blood cells, proteins, and casts in urine sediment occult blood tests and urinalysis, as well as the detection rates of various urinary system diseases, and the turnaround time of the two test methods were compared.

### 2.4. Statistical methods

SPSS version 25.0 statistical software was used to analyze the data. Count data and measurement data were represented by mean ± standard deviation (SD) and [n (%)], respectively. The former was subjected to the $\chi^2$ test, and the latter was subjected to the $t$ test. $P < 0.05$ indicated that the comparative data was statistically significant.

## 3. Results

### 3.1. Positive detection rates of each component

As shown in **Table 1**, when comparing the positive detection rates of each component of the two testing methods, the difference is insignificant, $P > 0.05$.

**Table 1.** Positive detection rates of each component [n (%)]

| Testing method | White blood cells | Red blood cells | Urinary protein | Urinary casts |
|---|---|---|---|---|
| Urine sediment occult blood test | 66 (82.50) | 72 (90.00) | 45 (56.25) | 30 (37.50) |
| Urinalysis | 65 (81.25) | 73 (91.25) | 44 (55.00) | 31 (38.75) |
| $\chi^2$ | 0.042 | 0.074 | 0.025 | 0.027 |
| *P* | 0.837 | 0.786 | 0.874 | 0.871 |

## 3.2. Detection rates of urinary system diseases

As presented in **Table 2**, there is no significant difference in the detection rates of various urinary system diseases between the two testing methods, $P > 0.05$.

**Table 2.** Detection rates of urinary system diseases [n (%)]

| Testing method | Acute nephritic syndrome (n = 33) | Kidney stones (n = 20) | Glomerulopathy (n = 19) | Renal tumors (n = 8) |
|---|---|---|---|---|
| Urine sediment occult blood test | 32 (96.97) | 19 (95.00) | 17 (89.47) | 8 (100.00) |
| Urinalysis | 31 (93.94) | 18 (90.00) | 18 (94.74) | 7 (87.50) |
| $\chi^2$ | 0.349 | 0.360 | 0.362 | 1.068 |
| *P* | 0.555 | 0.548 | 0.547 | 0.302 |

## 3.3. Turnaround time

As shown in **Table 3**, the urine sediment occult blood test had a longer turnaround time than urinalysis, $P < 0.05$.

**Table 3.** Turnaround time (mean ± SD)

| Testing method | Turnaround time (hours) |
|---|---|
| Urine sediment occult blood test | 8.30 ± 2.13 |
| Urinalysis | 1.03 ± 0.39 |
| *t* | 21.234 |
| *P* | 0.000 |

# 4. Discussion and conclusion

Urine occult blood is one of the routine outpatient tests. Common diseases such as urinary stones or high-incidence genitourinary system inflammation can cause urinary occult blood. Moreover, urinary occult blood only occurs in pathological conditions [3], thus it should be detected promptly with the underlying cause discovered, so that targeted treatment can be provided. Urinary system diseases exhibit symptoms such as frequent urination, urgent urination, painful urination, and hematuria [4]. They exert negative impacts on life and work, hence prompt diagnosis and treatment should be provided.

To provide accurate treatment for urinary system diseases, it is essential to establish a definite diagnosis through relevant examinations before symptomatic treatment is initiated. The urine occult blood test assesses the number of red blood cells in the urine sample and then compares it with the number of normal red blood cells in the urine. Significant number of red blood cells beyond the normal range indicates positive occult blood in urine [5,6]. This method can determine the presence of urinary system diseases. This study selected 80 patients with urinary system diseases as the research subjects, including 33 cases of nephritic syndrome, 20

cases of kidney stones, 19 cases of glomerulopathy, and 8 cases of renal tumors. Urinary system diseases often involve the kidneys, ureters, bladder, urethra, and other body parts, with main symptoms such as frequent and urgent urination, dysuria, and hematuria. Among them, nephritic syndrome, acute kidney stones, etc., are some of the more common urinary system diseases [7,8]. The results showed that the positive detection rates of each component of the two testing methods were not much different, indicating that the urine sediment occult blood test can achieve the same diagnostic performance as urinalysis, with high sensitivity and detection rates of relevant urine components [9,10].

Comparing the disease detection rates of the two testing methods, the results showed that the difference was not significant, further indicating that urine sediment occult blood test has a high efficiency in detecting urinary system diseases. The above analysis shows that the urine sediment occult blood test can detect the components in the urine and diagnose urinary system diseases. Additionally, the test method is also useful for disease prognosis [11,12], which helps to determine and adjust the treatment plan to achieve better treatment results. This study also compared the turnaround time of the two testing methods and found that the urine sediment occult blood test had a longer turnaround time than urinalysis. The more efficient urinalysis is recommended for emergency cases to avoid delaying the diagnosis and treatment [13,14].

All in all, urine occult blood testing has high application value in diagnosing urinary system diseases and is worthy of promotion.

## Disclosure statement

The authors declare no conflict of interest.

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