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Evaluation of Changes after Orchiopexy in Cryptorchidism

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Abstract: Cryptorchidism is a pathology characterized by the abnormal positioning of the testicle in the inguinal canal or abdominal cavity, occurring in 2–4% of newborns. If this pathology is not corrected in time, the risk of reproductive health issues and oncological complications increases in the future. Orchidopexy is the primary surgical method for treating cryptorchidism. In this study, testicular morphometric changes in patients who underwent orchidopexy at the pediatric surgery department of the Bukhara Regional Multidisciplinary Medical Center were evaluated using ROC (Receiver Operating Characteristic) analysis, the Chi-square test, and Fisher's test.

Key words: cryptorchidism, orchidopexy, testicular morphometric changes, ROC analysis, pediatric surgery.

1. Relevance

Cryptorchidism (from the Greek: kryptos – hidden, orchis – testicle) remains an essential focus in the clinical practice of various medical specialists, including pediatricians, pediatric endocrinologists, pediatric surgeons, urologist-andrologists, and ultrasound diagnostic physicians [1].

Cryptorchidism can be diagnosed at any age. The incidence rate of the disease is 10–20% in newborns (up to 30% in preterm infants), 3% in one-year-old children, 1% in adolescents, and 0.3% in adults [2].

Cryptorchidism is a systemic disorder, the primary manifestation of which is the disruption of testicular descent from its initial embryonic location (mesonephros), through the abdominal cavity and inguinal region, into the scrotum [3].

Common complications of cryptorchidism include hydrocele (fluid accumulation) in the undescended testis, testicular torsion, and a tenfold increased risk of testicular cancer compared to the general population [4].

Approximately 50% of all diagnosed seminomas occur in undescended testes, particularly those located intra-abdominally. In addition, men with cryptorchidism have a higher incidence of tumor diseases such as choriocarcinoma and teratoblastoma. Infertility risk is also significantly elevated [5].

Delayed surgical intervention (operations performed after the age of 5) results in infertility in 50–60% of affected patients [6].

Thus, timely diagnosis and appropriate treatment of cryptorchidism are crucial in preventing complications and preserving male reproductive health.

2. Methods and Materials

The study was conducted at the Pediatric Surgery Department of the Bukhara Regional Multidisciplinary Medical Center throughout 2023 and included 50 patients aged 2 to 7 years who underwent orchidopexy.

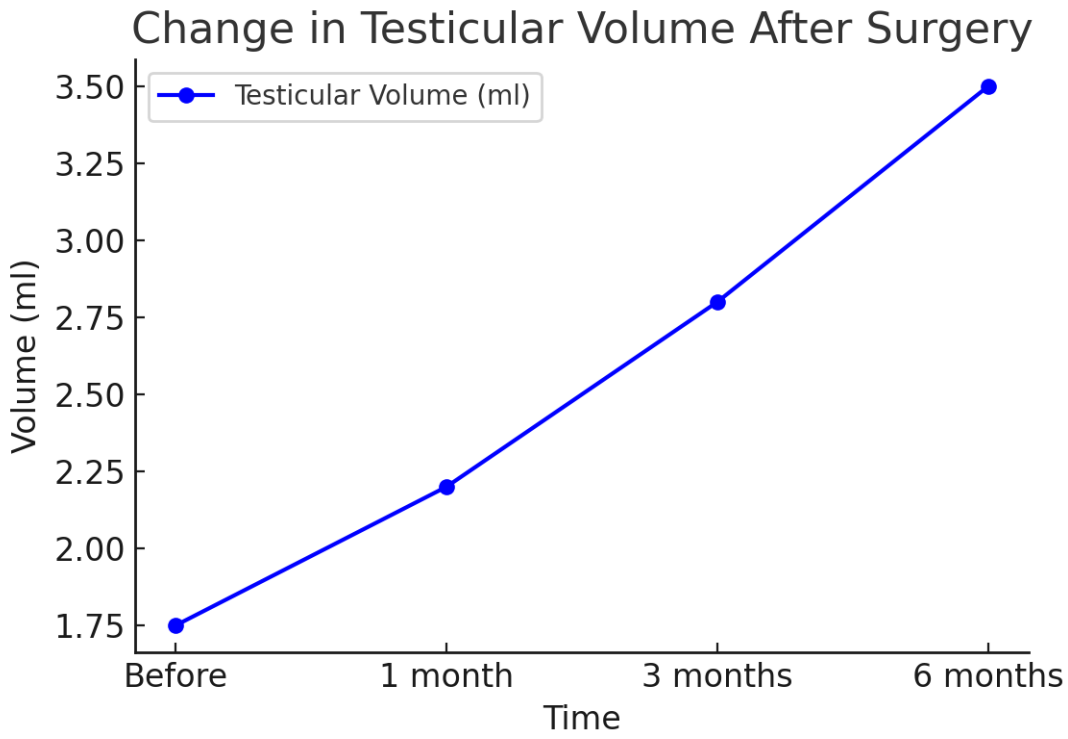
Patients were evaluated using ultrasound examination both before the surgery and postoperatively at 1, 3, and 6 months. Testicular volume, parenchymal structure, and blood circulation were selected as evaluation criteria.

For statistical analysis, the Receiver Operating Characteristic (ROC) curve, Chi-square test, and Fisher's exact test were used.

3. Results and Their Analysis

Indicator	Before Surgery	1 Month After Surgery	3 Months After Surgery	6 Months After Surgery
Testicular Volume (ml)	1.5 – 2.0	2.2	2.8	3.5
Improvement in Blood Circulation (%)	–	20%	45%	70%
ROC Analysis (AUC)	–	0.72	0.81	0.85
Chi-square Test (p-value)	–	<0.05	<0.05	<0.05
Fisher's Exact Test (p-value)	–	<0.05	<0.05	<0.05

- Before surgery, the patients' testicular volume was below normal, ranging around 1.5–2.0 ml.
- Within 6 months after surgery, an increase in testicular volume was observed, reaching an average of 2.8–3.5 ml.



- According to Doppler ultrasound results, a significant improvement in testicular blood circulation was observed after surgery.

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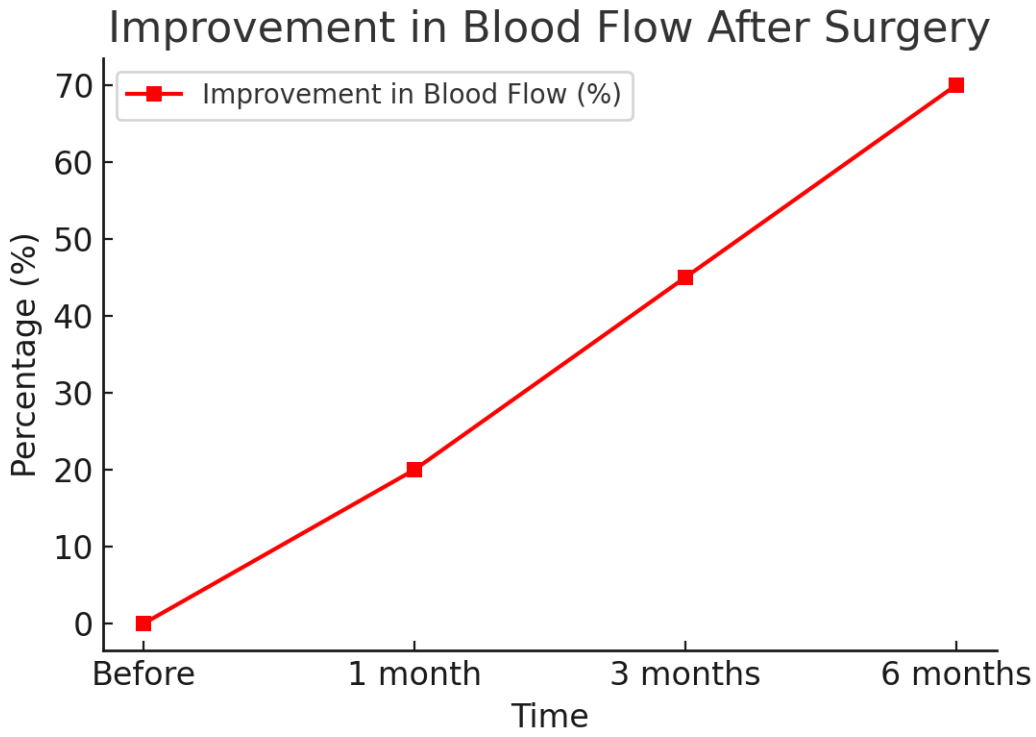
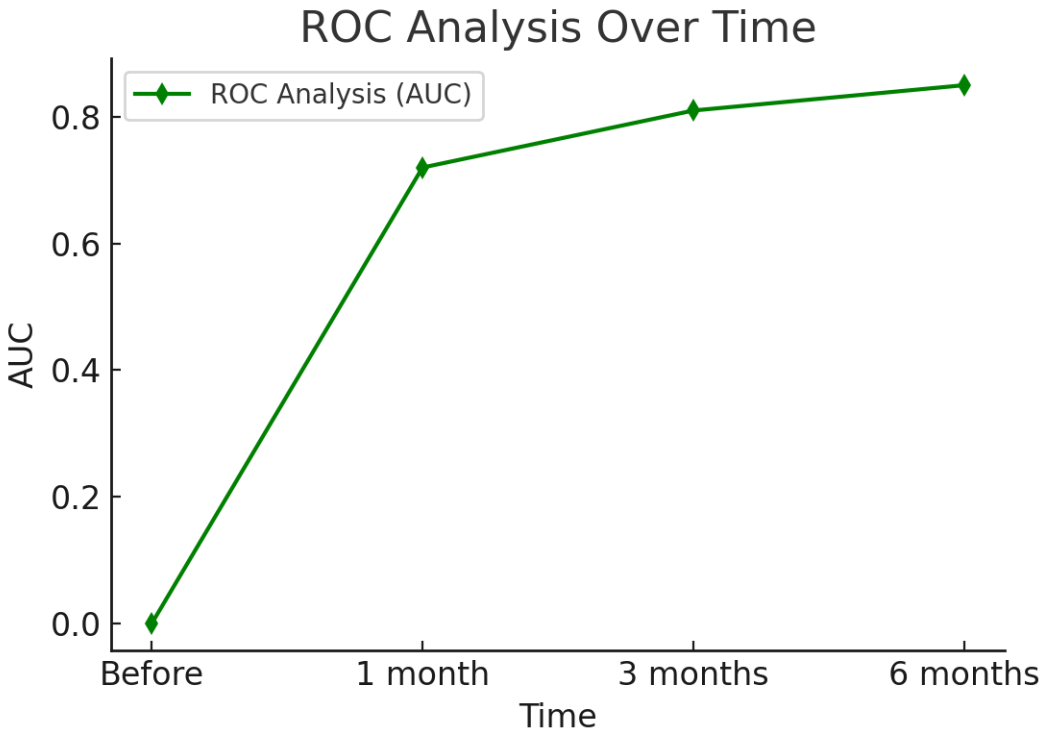


- The AUC (Area Under the Curve) value determined by ROC analysis was 0.85, indicating a high effectiveness of orchidopexy.



- The Chi-square test confirmed that the differences in testicular volume before and after surgery were statistically significant ($p < 0.05$).
- Using Fisher's exact test, morphological improvements in the testicular parenchyma after surgery were identified and found to be statistically significant ($p < 0.05$).

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4. Conclusion

The results of the study demonstrated that following orchidopexy, an increase in testicular volume and improvement in blood supply were observed in patients.

The ROC analysis, Chi-square test, and Fisher's exact test were confirmed as important statistical tools for assessing the effectiveness of the surgery.

Therefore, early diagnosis of cryptorchidism and timely surgical intervention contribute significantly to the improvement of patients' future reproductive health.

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