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Surgical Correction Of Ectopic Scrotum, Rotational Flap Reconstruction, Multicenter Study

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ABSTRACT

Background; Ectopic scrotum is a rare congenital anomaly. It is the presence of the normal hemiscrotum or a scrotal tissue away from its normal location. The aim of this study is to assess the outcome of surgical correction of ectopic scrotum in children and adult.

Patients and methods: Data was collected retrospectively for 15 cases of ectopic scrotum from a multicenter pediatric surgery unit at Minia, A suit and Cairo University.

Results: From 15 patients, ten (66.7%) were femoral, two (13.3%) cases were suprainguinal, two (13.3%) cases were infrainguinal and one case was below and lateral to penni**.** Regarding outcome of surgery; surgical and cosmetic outcome was good and succeed in 93.3% of cases and only one case (6.7%) failed, all adults was succeed and the only one case failed was child. Length of hospital stay after surgery was ranged from 1-3 days with mean of 1.3±0.7 days. Regarding the morning erection was positive in all cases.

Conclusion: Single stage rotational flap reconstructing is feasible and safe technique and could achieve good cosmetic and surgical outcome.

Keywords: *Ectopic Scrotum, Rotational flap reconstruction, Multicenter study.*

1. INTRODUCTION

The ectopic scrotum is an extremely rare congenital scrotal malformation and commonly accompanied by other congenital malformations [1].

Ectopic scrotum is de*fi*ned as the presence of the normal hemi-scrotum or a scrotal tissue away from its normal location; between the penis and the perineum, with de*fi*ciency of one hemi-scrotum. Simply it is a congenital anomaly in which the scrotum located in a position away from its normal scene [2].

Scrotal anomalies include scrotal hypoplasia, penoscrotal trans position, bifid scrotum, ectopic scrotum and accessory scrotum. The last two entities are extremely rare, whereas the first three are relatively common [3].

This anomaly is associated with other genitourinary anomalies [4].

It is mainly found in the inguinal, suprainguinal, infrainguinal, or perineal area, ectopic scroum can occur anywhere from the inguinal canal and the perineum to the middle of the thigh [1].

Patients with an ectopic scrotum should undergo upper urinary tract imaging with ultrasonography, with the possible indication for a further investigation like magnetic resonance or renal isotope scanning [2].

The management of ectopic scrotum includes one-stage repair (simultaneous scrotoplasty and orchiopexy), two-stage repair (orchiopexy with subsequent scrotoplasty or scrotoplasty with subsequent orchiopexy), and excision of ectopic scrotal tissue [5].

The aim of this study is to study the outcome of surgical correction of ectopic scrotum in children and adult.

Patient and Methods:

Study design and data collection:

Multi center retrospective cohort study includes patients with ectopic scrotum managed by Rotational flap reconstruction in pediatric surgrey unit at Minia, A suit and Cairo University.

The study population:

Inclusion criteria

the study included all (15) patients classified to 12 children below 5 years of age and 3 adults during the period from January 2020 to January 2024 diagnosed with ectopic scrotum and admitted for surgery.

The data will include:

Detailed history and clinical findings in each of the cases were obtained included the following data:

- Sociodemographic data: age residence
- Site of ectopic scrotum
- Surgical technique of relocation and surgical data: type of surgery, duration of surgery, length of hospital stay.

Surgical procedure:

Single stage Rotational flap reconstruction was used to manage the cases including Island flap, Multiple z plasty, Triangular flap, Two Island flap and z plasty (Figure I)

Figure I: Case; Photographs of the surgery procedure.

Post-operative follow up after surgery and its outcome, success or failed surgery

In the early postoperative period, we examine the placement of the penis and scrotum in their anatomical positions, The perineal skin had no tension at all due to non-excessive removal of scrotal and perineal skin.

Later after surgery there was good healing, the perineal skin had no tension, and all structures were kept in their topical positions, preserving their functions and with no complications and acceptable cosmetic appearance. Figure II and III

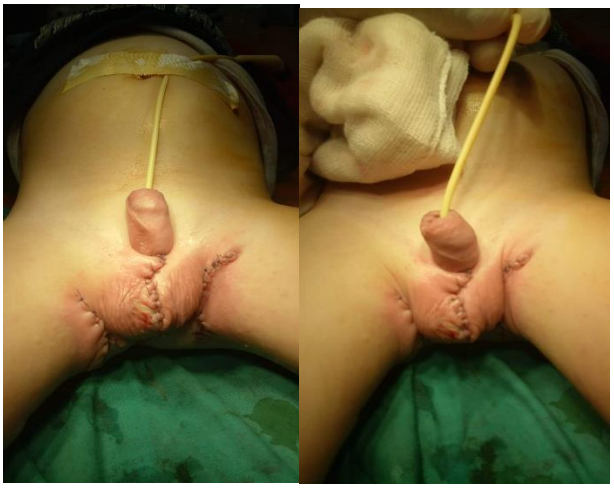


Figure II : Case: One week post-operative Follow up

Figure III : Case: Two week post-operative Follow up

Ethical approval: The study followed common ethical principles for scientific research. Research proposal was approved by IRB committee of the Faculty of Medicine. Approval number 1446/02/2025. All information gained from study was to be treated as confidential and private

2. RESULTS

The current study included 15 cases with ectopic scrotum, 12 (80%) of them were child less than five years old and 3(20%) were adults more than 20 years old, the age of the studied cases ranged from 1.5 year to 3 year with mean age of 7.5±10.3 years, the mean age of the studied child was 2.9±1.2 years while the mean age of adults was 27.3±5.7 years (table 1).

Regarding their residence; More than half (53.3%) of the studied cases were from Minia, 33.3% from Assuit Governorate and 13.3% from Cairo Governorate (table 1).

Table (1): Demographic Characteristics of the studied patients:

Data	**Total** **No=15**	**Children** **No=12**	**Adults** **No=3**
Age (year)			
Range	1.5-34	1.5-4.9	24-34
Mean±SD	7.5±10.3	2.9±1.2	27.3±5.7

Residence			
Minia	9(53.3%)	7(58.3%)	1(33.3%)
Assiut	5(33.3%)	3(25%)	2(66.7%)
Cairo	2(13.3%)	2(16.7%)	0(0.0%)

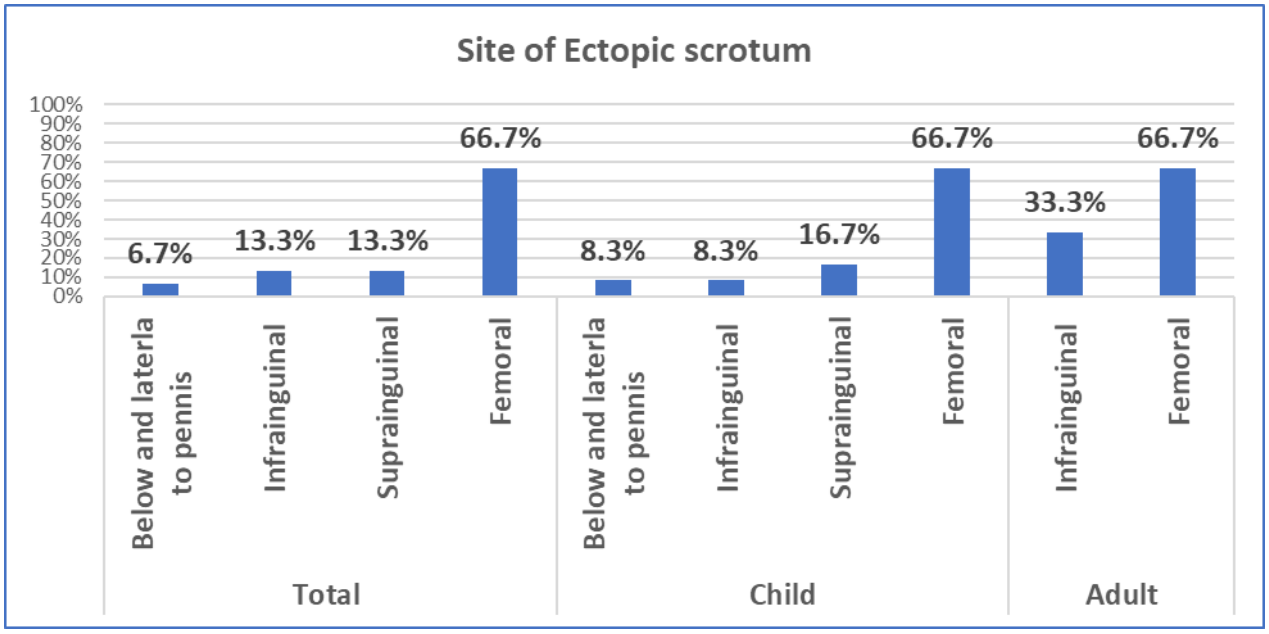
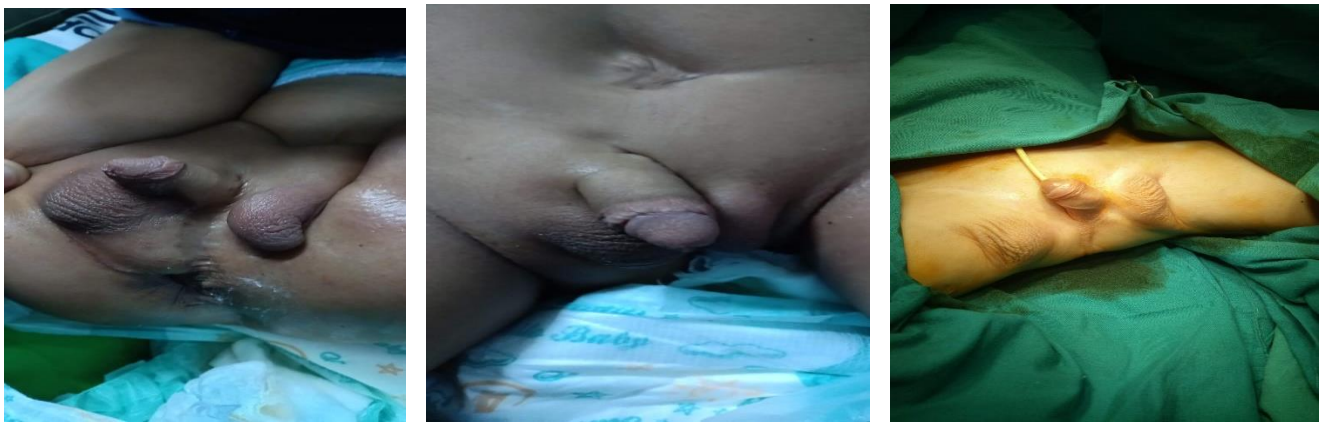


Figure (1): Site of Ectopic Scrotum.

Figure 1 shows the site of ectopic scrotum among the studied cases, ten (66.7%) patients were femoral, two (13.3%) cases were suprainguinal, two (13.3%) cases were infrainguinal and one case was below and lateral to pennis.



A **B** **C**

Figure IV: Clinical appearance of Ectopic scrotum: A: Inguinal, B: Perineum, C: at upper thigh

Table (2): Surgical data among the studied patients:

Data	Total No=15	Children No=12	Adults No=3
Type of surgery			
Island flap	9(60%)	8(66.7%)	1(33.3%)
Multiple z plasty	1(6.7%)	1(8.3%)	0
Triangular flap	1(6.7%)	1(8.3%)	0
Two Island flap	1(6.7%)	0(0.0%)	1(33.3%)
z plasty	3(20%)	2(16.7%)	1(33.3%)
Duration of Surgery (hr)			
Range	1-3	1.30-3	1-2
Mean±SD	2.01±0.6	2.17±0.5	1.40±0.5
Urinary catheterization	15(100%)	12(100%)	3(100%)

The above tables show the surgical data:

Rotational flap reconstruction techniques were used to manage the ectopic scrotum. Nine cases (60%) managed by Island flap , three cases (20%) by z plasty, one case (6.7%) by triangular flap, one case (6.7%) by multiple z plasty and one case (6.7%) by two Island flap.

Among child, more than half of them (66.7%) managed by island flap, 16.7% by z plasty, 8.3% by multiple z plasty and 8.3% by triangular flap.

Among adults 33.3% managed by Island flap, 33.3% by two Island flap and 33.3% by z plasty.

Regarding the duration of surgery it was ranged from 1-3 hours with mean of 2.01±0.6 hours, the mean duration was longer for children (2.17±0.5hours) than adults (1.40±0.5 hours).

All cases had Urinary catheterization

Table (3): Outcome of Surgery among the studied patients:

Data	Total No=15	Children No=12	Adults No=3
Surgical and cosmetic			
Succeed	14(93.3%)	11(91.7%)	3(100%)
Failed	1(6.7%)	1(8.3%)	0(0.0%)
Hospital stay (days)			
Range	1-3	1-3	1-3
Mean±SD	1.3±0.7	1.2±0.6	1.6±1.1
Morning erection			
Positive	15(100%)	12(100%)	3(100%)

Regarding outcome of surgery; surgical and cosmetic outcome was good and succeed in 93.3% of cases and only one case (6.7%) failed, all adults was succeed and the only one case failed was child.

Length of hospital stay after surgery was ranged from 1-3 days with mean of 1.3±0.7 days. The hospital stay was 1.2±0.6 days for children and 1.6±1.1 days for adults.

Regarding the morning erection was positive in all cases.

3. DISCUSSION

Ectopic scrotum is an extremely rare congenital anomaly characterized by the displacement of scrotal tissue to an abnormal location, separate from its typical position between the penis and the perineum. This condition is often associated with other developmental abnormalities, including inguinal hernias, undescended testes, cryptorchidism, and exstrophy of the bladder. [6]

Ectopic scrotum is extremely rare, with 27 cases reported in the literature up to 2017 [7].

The exact cause of ectopic scrotum was not fully understood but several theories had been proposed; Embryological, mechanical, genetic, chromosomal, teratogenic factors were suggested, aberrant development of gubernaculum is accused for ectopic scrotum [8].

The majority (80%) of cases who undergoing surgery in the current study were child less than 5ysfive years old and only 20% were adults, this mean that early surgical intervention is typically recommended to reposition the scrotal tissue and address any associated anomalies [3].

Regards the location of this ectopia it can be Inguinal, suprainguinal, infrainguinal, or perineal [9], and suprainguinal type is the most common [7]. The current study revealed that ten (66.7%) patients were femoral, two (13.3%) cases were suprainguinal, two (13.3%) cases were infrainguinal and one case was below and lateral to pennis.

Congenital ectopic scrotum classified into: Suprainguinal, Perineal, Femoral, Other sites and the most common site is suprainguinal type, Unilateral femoral ectopic scrotum was also reported [2].

Regards the management of ectopic scrotum, scrotoplasty and orchiopexy may be performed at 6 to 12 months of age or earlier if other surgical procedures are necessary for an associated anomaly, the recommended intervention is a single stage rotational flap reconstruction with orchidopexy, as it is feasible and should be considered (Palmer and Palmer, 2016).

The management of ectopic scrotum includes one-stage repair (simultaneous scrotoplasty through scrotal transposition and orchiopexy) without sacrificing scrotal tissue, while preserving and relocating the testis, two-stage repair (orchiopexy with subsequent scrotoplasty or scrotoplasty with subsequent orchiopexy), and excision of ectopic scrotal tissue [5].

The cases of current study were managed by single stage rotational flap reconstruction which is the recommended intervention in cases of ectopic scrotum as following; 60% managed by Island flap , 20% by z plasty, 6.7% by triangular flap, 6.7% by multiple z plasty and 6.7% by two Island flap. the surgery lasted 1-3 hours with mean of 2.01±0.6 hours.

Regarding outcome of surgery; surgical and cosmetic outcome was good and succeed in 93.3% of cases and only one case (6.7%) failed. The length of hospital stay after surgery was ranged from 1-3 days with mean of 1.3±0.7 days and the morning erection was positive in all cases.

This outcome in agreement with previous study reports, Singh et al., [3] who describe single stage rotational flap recon struction with or chidopexy in 4 cases with ectopic scrotum and reported that Surgical and cosmetic outcome has been excellent.

Also Hisamatsu et al., [7] who studied the surgical correction of ectopic scrotum and penile torsion in a 5-year-old boy reported that on follow up after surgery the rotated scrotum had an acceptable cosmetic appearance, and both testes were viable in the scrotum

4. CONCLUSION

In conclusion; single stage rotational flap reconstructing is feasible and safe technique and could achieve good cosmetic and surgical outcome.

Conflict of interest: no conflict of interest.

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