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Role of Contralateral Orchidopexy Along with Ipsilateral Orchidectomy or Orchidopexy in Unilateral Testicular Torsion: A 15-Case Paediatric Series

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Abstract: ***Background**: Testicular torsion is a time-critical paediatric surgical emergency. The predisposing bell-clapper anomaly is often bilateral, providing the anatomical basis for contralateral fixation at the index exploration. **Methods**: This combined prospective and retrospective descriptive series included 15 paediatric patients with unilateral testicular torsion managed over a three-year period at a tertiary-care teaching hospital. History, clinical examination, colour Doppler findings and operative notes were reviewed. The normal side was explored first through a separate vertical scrotal incision and fixed by three-point orchidopexy. The affected side was then explored through a second vertical incision; viable testes underwent orchidopexy and non-viable testes underwent low orchidectomy. **Results**: The mean age was 11.6 years (range 5–17 years). Left-sided torsion occurred in 9 (60.0%) and right-sided torsion in 6 (40.0%). Mean symptom duration was 13.2 hours. Testicular salvage was achieved in 10 (66.7%), while 5 (33.3%) underwent low orchidectomy. Bilateral bell-clapper anomaly was documented in 13 (86.7%) patients. Other operative findings included hydrocele in 3, retractile testis in 1, and patent processus vaginalis/indirect hernia in 1 patient. **Conclusion**: Routine contralateral three-point orchidopexy is justified in unilateral intravaginal torsion because the underlying anatomical predisposition is commonly bilateral. Correct orientation with the epididymis facing posteromedially and fixation at three points provides broad rotational restraint.*

Keywords: testicular torsion; paediatric acute scrotum; contralateral orchidopexy; bell-clapper anomaly; low orchidectomy; three-point fixation

1. Introduction

Testicular torsion results from rotation of the spermatic cord, causing venous obstruction followed by arterial compromise, ischaemia and infarction. The likelihood of testicular salvage declines as the duration and degree of torsion increase; therefore, emergency exploration should not be delayed when clinical suspicion is high. [2–5,10]

The bell-clapper anomaly is the principal anatomical substrate for intravaginal torsion. High investment of the tunica vaginalis around the testis and distal spermatic cord leaves the testis freely mobile, commonly in a horizontal lie. Because this developmental configuration is frequently bilateral, an apparently normal opposite testis may remain at risk of metachronous torsion. [1,6]. This study describes the clinical presentation, Doppler findings, operative anatomy and outcomes of 15 paediatric patients, with particular emphasis on a standardized sequence in which the normal side is fixed first through a separate vertical incision, followed by exploration and definitive treatment of the affected side.

2. Materials and Methods

Study design: Combined prospective and retrospective, technique-focused descriptive case series.

Study setting: Department of General Surgery, tertiary-care teaching hospital.

Study period: 3 years.

Study population: 15 patients in the paediatric age group who underwent emergency surgery for unilateral testicular torsion.

Inclusion criteria: Paediatric patients with clinically suspected or Doppler-supported unilateral testicular torsion who underwent emergency operative exploration during the study period.

Exclusion criteria: Neonatal extravaginal torsion, bilateral synchronous torsion, torsion of appendix testis without spermatic-cord torsion, and records lacking essential operative details.

Data collection: Retrospective cases were identified from emergency admission registers, case files, Doppler reports and operative notes. Prospective cases were documented using the same predefined variables. Recorded variables included age, side, duration and nature of symptoms, vomiting, prior intermittent pain, testicular lie, cremasteric reflex, scrotal swelling, Doppler vascularity and whirlpool sign, degree and direction of torsion, bell-clapper anomaly,

testicular viability, associated abnormalities, definitive procedure, complications and follow-up.

Statistical analysis: Continuous variables were summarized as mean and range. Categorical variables were expressed as frequency and percentage. No inferential statistical testing was performed because of the descriptive design and small sample size.

Ethics and consent: Institutional ethics approval was attained and written informed consent was taken.

3. Operative Technique

1) Emergency exploration was undertaken under appropriate anaesthesia after resuscitation, antibiotic prophylaxis and informed consent.
2) The clinically normal side was approached first through a vertical scrotal incision. The testis was delivered and inspected for horizontal lie, excessive mobility, high tunica vaginalis investment and associated abnormalities.
3) The normal testis was oriented anatomically with the epididymis facing posteromedially and the lower pole positioned dependently, ensuring that no twist remained in the spermatic cord.
4) Three-point orchidopexy was performed using three interrupted non-absorbable sutures between the tunica albuginea and dartos at the medial, lateral and inferior aspects. The epididymis, vas deferens and testicular vessels were carefully avoided.
5) The normal-side wound was closed after confirming haemostasis and correct testicular lie.
6) The affected side was then approached through a separate vertical scrotal incision. The testis was delivered, and the direction and degree of spermatic-cord torsion were documented before detorsion.
7) The cord was detorsed and the testis was wrapped in warm saline-soaked gauze. Viability was reassessed from colour, turgor and reperfusion; when uncertain, bleeding after a limited tunica albuginea incision was assessed.
8) A viable testis was positioned with the epididymis posteromedially and secured by three-point orchidopexy. A frankly necrotic, non-reperfusing testis underwent low orchidectomy after secure ligation of the spermatic cord.
9) Associated abnormalities such as hydrocele, patent processus vaginalis/hernia, retractile testis or undescended testis were specifically documented in the operative note and managed as clinically appropriate.
10) Final haemostasis and testicular orientation were confirmed, and the affected-side wound was closed in layers.

4. Results

The series included 15 paediatric patients with a mean age of 11.6 years (range 5–17 years). Left-sided torsion was present in 9 (60.0%) and right-sided torsion in 6 (40.0%). Mean symptom duration was 13.2 hours (range 2–36 hours). All patients presented with acute scrotal pain; vomiting or nausea, scrotal swelling, a high-riding or horizontal testis and absent cremasteric reflex were the most frequent associated findings. Colour Doppler demonstrated absent intratesticular flow in 9 (60.0%) and markedly reduced flow in 6 (40.0%).

At exploration, bilateral bell-clapper anomaly was documented in 13 (86.7%), an ipsilateral-only anomaly in 1 (6.7%), and no definite anomaly was documented in 1 (6.7%). The degree of torsion ranged from 360° to 1080°. Ten testes (66.7%) were salvaged by detorsion and orchidopexy, whereas five (33.3%) underwent low orchidectomy. Contralateral three-point orchidopexy was performed in all 15 patients.

Table 1: Summary of clinical, Doppler and operative findings

Variable	Number/ Mean	Percentage/ Range
Age, years	11.6	5–17
Left-sided torsion	9	60.0%
Right-sided torsion	6	40.0%
Symptom duration, hours	13.2	2–36
Absent intratesticular flow on Doppler	9	60.0%
Reduced intratesticular flow on Doppler	6	40.0%
Bilateral bell-clapper anomaly	13	86.7%
Ipsilateral-only bell-clapper anomaly	1	6.7%
Bell-clapper anomaly not definitely documented	1	6.7%
Ipsilateral testicular salvage	10	66.7%
Low orchidectomy	5	33.3%
Contralateral 3-point orchidopexy	15	100%
Minor postoperative complications	2	13.3%
Follow-up, months	9.0	6–12

Table 2: Summary of history and clinical examination

Clinical feature	Cases	Percentage
Acute scrotal/testicular pain	15	100%
Scrotal swelling	12	80.0%
Nausea or vomiting	8	53.3%
High-riding/elevated testis	12	80.0%
Horizontal/transverse lie	8	53.3%
Absent cremasteric reflex	15	100%
Marked testicular tenderness	15	100%

Table 3: Degree of torsion documented in operative notes

Degree of torsion	Cases	Percentage
360°	3	20.0%
540°	3	20.0%
720°	6	40.0%
900°	2	13.3%
1080°	1	6.7%

Table 4: Associated abnormalities documented in operative notes

Associated abnormality	Cases	Percentage
Reactive/small hydrocele	3	20.0%
Retractile contralateral testis	1	6.7%
Patent processus vaginalis/indirect hernia	1	6.7%
Undescended testis	0	0.0%

Table 5: Patient-wise clinical and operative dataset

Case	Age	Side	Duration (h)	Torsion	Bell-clapper finding	Viability	Affected-side procedure	Other OT finding	Complication
1	14	Left	18	720	Bilateral	Non-viable	Low orchidectomy	Reactive hydrocele	None
2	6	Left	36	900	Bilateral	Non-viable	Low orchidectomy	None	None
3	12	Right	5	540	Bilateral	Viable after detorsion	3-point orchidopexy	None	None
4	16	Left	7	720	Bilateral	Viable after warming	3-point orchidopexy	Small hydrocele	Transient scrotal oedema
5	11	Right	10	720	Bilateral	Viable after warming	3-point orchidopexy	Contralateral retractile testis	None
6	15	Left	30	1080	Bilateral	Non-viable	Low orchidectomy	None	None
7	9	Left	4	360	Ipsilateral only	Viable	3-point orchidopexy	None	None
8	17	Right	14	720	Bilateral	Viable after warming	3-point orchidopexy	Patent processus vaginalis/small indirect hernia	Superficial wound erythema
9	13	Left	6	540	Bilateral	Viable	3-point orchidopexy	None	None
10	8	Right	26	900	Bilateral	Non-viable	Low orchidectomy	Reactive hydrocele	None
11	14	Left	9	720	Bilateral	Viable after detorsion	3-point orchidopexy	None	None
12	10	Right	3	360	Bilateral	Viable	3-point orchidopexy	None	None
13	5	Left	20	720	Bilateral	Non-viable	Low orchidectomy	None	None
14	7	Right	8	540	No definite anomaly documented	Viable after warming	3-point orchidopexy	None	None
15	17	Left	2	360	Bilateral	Viable	3-point orchidopexy	None	None

5. Case Example and Operative Images

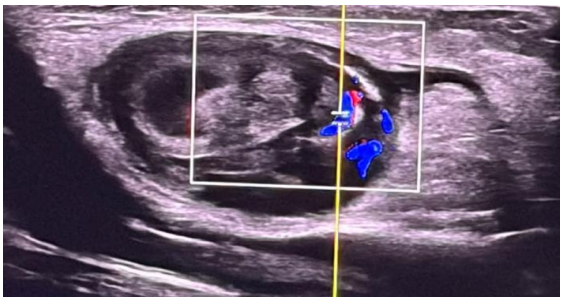

Figure 1: left testicular torsion, with altered testicular echotexture, absent intratesticular vascularity and incomplete twisting of the spermatic cord. Associated bulky epididymis, thickened cord and reactive septated hydrocele are present

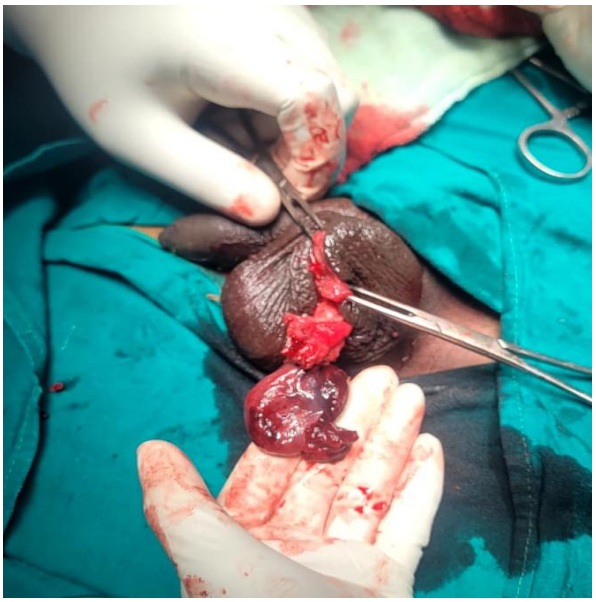

Figure 2: Congested torsed testis delivered through the vertical scrotal incision; dark colour and failure of reperfusion indicate advanced ischaemia

Figure 3: Normal contralateral testis before fixation, showing preserved colour and surface vascularity. During fixation, the epididymis is oriented posteromedially and the testis is secured at three points

6. Discussion

The main rationale for contralateral orchidopexy is that the anatomical abnormality permitting intravaginal torsion commonly affects both testes. In this series, bilateral bell-clapper anatomy was documented in most patients. The normal appearance and vascularity of the opposite testis therefore did not exclude the risk of future metachronous torsion. [1,6]

Fixing the normal side first ensured that the remaining testis was protected before manipulation of, or possible orchidectomy on, the affected side. Separate vertical scrotal

incisions provided direct access to each hemiscrotum, reduced cross-contamination between operative fields and permitted independent closure. This sequence is particularly relevant when the affected testis proves non-viable.[1]

Correct orientation is as important as suture fixation. The epididymis should face postero-medially, the lower pole should remain dependent and the spermatic cord should be free of residual rotation. Three-point fixation at the medial, lateral and inferior aspects limits movement in multiple planes. A single-point fixation may act as a pivot and has been associated with recurrent torsion. [1,8,9]

The degree of torsion ranged from 360° to 1080°. Patients requiring orchidectomy generally had a longer duration of symptoms, absent Doppler flow and greater degrees of torsion. Although this pattern is clinically expected, the small descriptive sample does not permit formal prediction modelling. [4,5,7,10]

Associated abnormalities were uncommon but clinically relevant. Reactive hydrocele, a retractile contralateral testis and a patent processus vaginalis or small indirect inguinal hernia were documented. A structured operative note should therefore include the testicular lie, tunica vaginalis attachment, degree and direction of torsion, viability assessment, epididymal orientation, associated abnormalities, suture material and number of fixation points.[1]

The principal limitations of this study are the small sample size, mixed prospective–retrospective design and dependence on the completeness of retrospective operative documentation. In addition, the source manuscript states that several patient-level records were illustrative. All case-level data, study dates, ethical approval details and follow-up findings must therefore be reconciled with authentic institutional records before submission.[11]

7. Conclusion

In paediatric unilateral intravaginal testicular torsion, contralateral orchidopexy should be performed at the index operation because the predisposing bell-clapper anomaly is commonly bilateral. A standardized sequence of normal-side fixation first through a vertical incision, followed by separate affected-side exploration, correct posteromedial epididymal orientation and three-point fixation provides a reproducible technique. Non-viable testes should undergo low orchidectomy after careful reassessment, while all operative anatomical findings should be documented systematically.

Declarations

Ethics approval: Done.

Consent to participate: Written informed consent from parents/guardians and age-appropriate assent was confirmed from source records.

Consent for publication: Specific written consent was taken for publication of operative and radiological images.

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Conflict of interest: The authors declare no conflict of interest.

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