Testicular torsion treatment: the horns of a dilemma?

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ABSTRACT

INTRODUCTION Testicular torsion treatment rests on the horns of a dilemma, with widespread national variation in whether the responsible surgical specialty is general surgery or urology, even in hospitals with both general surgery and urology emergency service assets. This study aimed to quantify higher surgical trainee operative experience and confidence in managing suspected testicular torsion in a single UK deanery (Wales).

MATERIALS AND METHODS Anonymised logbook data were obtained via the Intercollegiate Surgical Curriculum Programme version 10 using the head of school report function for all general surgery ($n=53$) and urology ($n=15$) higher surgical trainees, which were combined with the distribution of an electronic self-administered questionnaire.

RESULTS Median operative scrotal explorations recorded for all general surgery higher surgical trainees and senior general surgery higher surgical trainees (ST7+) was 7 (range 1–22) and 10 (range 1–22), compared with 21 (range 9–64, $p=0.00104$) and 24 (19–64, $p<0.001$) for urology higher surgical trainees. The questionnaire response rate was 64.6% (general surgery 31/50, urology 11/15). Confidence levels in assessing adult and paediatric patients were lower in general surgery when compared with urology higher surgical trainees: median adult confidence rate 7/10 compared with 9/10, and paediatric confidence rate 7/10 compared with 8/10 ($p<0.001$ and $p=0.053$, respectively). All higher surgical trainees preferred urology as the accountable hospital specialty when both assets were available.

DISCUSSION AND CONCLUSION General surgery higher surgical trainees receive less than 50% of the operative exposure of urology higher surgical trainees in emergency scrotal surgery, which has important implications for curriculum competence development and patient safety.

KEYWORDS

Surgical education – Surgical training – Testicular torsion

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Introduction

General surgical specialisation has developed apace over the past four decades but emergency general surgery provision has been governed by local geographical resource. Major military conflicts have driven advances in the specialisation of orthopaedics, neurosurgery and plastic surgery, but arguably has trailed the above with few dedicated specialist urology appointments and some urological procedures remained within the remit of general surgery.¹ The British Association of Urological Surgeons received recognition from the Royal College of Surgeons in 1968 as one of the six specialist surgical associations responsible for training requirements.¹

Despite urological surgery being an established specialty, not all hospitals are able to provide resident urology middle-grade cover and management of urological emergencies may, by default, fall under the remit of general surgery. Testicular torsion is a surgical emergency

with possible consequences for non-operative management, including testicular loss and infertility. Testicular torsion has an annual incidence of approximately 3.8/100,000 males younger than 18 years and accounts for approximately one-third of paediatric scrotal disease.² Other presentations of the acute scrotum include infection, trauma, inguinal hernia, hydrocoele and systematic disease. Clinical assessment and imaging, including doppler ultrasound, cannot exclude testicular torsion. Thus, any suspicion requires immediate exploration.² All general surgery and urology trainees are expected to have reached competence to manage testicular torsion independently by completion of training.^{3–4} Previous work has identified significant variation in the management of testicular torsion between general surgeons and urologists, probably representing differences in training.⁵ The Association of Surgeons in Training has raised concerns regarding the supervision of the management of patients with testicular torsion, as well as

the reduction in training opportunities as a consequence of changes in working hours.⁶

Testicular torsion treatment faces challenges, with widespread national variation in whether the responsible surgical specialty is general surgery (general surgery) or urology, even in hospitals with both general surgery and urology emergency service assets. This study aimed to quantify operative experience and confidence in managing suspected testicular torsion among higher surgical trainees in a single UK deanery (Wales).

Materials and methods

Logbook data

Individualised, anonymised logbook data were obtained via the Intercollegiate Surgical Curriculum Programme (ISCP) version 10, using the head of school report function for all National Training Number (NTN) higher surgical trainees (HSTs), in general surgery and urology (current trainees or those achieving a certificate of completion of training in the last 12 months). Formal permission under the ISCP data governance structure was not required because the study was in keeping with service evaluation. The logbook (www.elogbook.org) codes included in this study are shown in Table 1.

Questionnaire

An electronic self-administered 24-item questionnaire was distributed to all current NTN trainees in general surgery and urology using GoogleForms. The questionnaire was designed with reference to previously published guidelines on questionnaire-based research.^{7–8} Question design was undertaken by both urology and general surgery trainees. The questions assessed individual trainee's confidence in managing suspected testicular torsion in both adults and children, the service set-up in their current hospital, their views on which specialty should be responsible for these patients (in hospitals where both general surgery and urology services existed) and their exposure to other paediatric, urological and groin surgery. Data collection occurred between 1 December 2018 and 31 January 2019. Trainees were asked to describe information relating to their current rotation, or their most recent rotation if currently out of programme and all data were anonymised. No incentives were offered for participation. The ethical dimensions of this evaluation study were considered and no concerns were identified as completion of the questionnaire was taken as implied consent to participate. Survey sample size calculations were based on standard published formulas.⁹

Statistical analysis

Statistical analysis appropriate for non-parametric data was performed using GraphPad Prism 8 (GraphPad Software, La Jolla, CA, USA). A *p*-value of less than 0.050 was considered significant.

Results

Logbook data

Logbook data were collected from 68 NTN HSTs; 53 general surgery and 15 urology. Demographic details are described in Table 2. The median (range) operative scrotal explorations recorded for all general surgery HSTs; senior general surgery HSTs (ST7+), was 7 (range 1–22) and 10 (range 1–22) compared with 21 (range 9–64, *p*=0.00104) and 24 (range 19–64, *p*<0.001) for urology HSTs (Fig 1).

Table 1 Logbook codes for general surgery and urology included in the study.

Specialty	Logbook code
General surgery	Torsion of testis (child)- orchidectomy
	Torsion of testis (child)- orchidopexy
	Urology- torsion of testis (adult)- orchidectomy
	Urology- torsion of testis (adult)- orchidopexy
	Orchidopexy
Urology	Exploration of testis (N135)
	Fixation of testes
	Scrotal orchidopexy for twisted spermatic cord
	Excision of appendix of testis (N078)
	Exploration of scrotum (N034)
	Reduction of testicular torsion
	Excision of strangulated testis (N063c)

Table 2 Trainees by training grade and specialty.

Specialty	Training grade	Trainees (n)
General surgery	ST3	7
	ST4	8
	ST5	7
	ST6	9
	ST7	11
	ST8	8
	CCT in last 12 months	3
Urology	ST3	2
	ST4	1
	ST5	3
	ST6	3
	ST7	6
	CCT in last 12 months	0
CCT, certificate of completion of training; ST, specialty training.		

Questionnaire

The questionnaire response rate was 64.6% (general surgery 31/50, urology 11/15). The grades of HSTs included in the questionnaire responses included current junior registrars (ST3) to final-year registrars (ST7/8) from both specialties. The questionnaire was not distributed to HSTs who had completed training. Confidence levels in assessing adult and paediatric patients were lower in general surgery HSTs compared with urology HSTs: median adult confidence rate 7/10 (range 2–9) compared with 9/10

(range 7–10, $p<0.001$). Paediatric confidence rate was 7/10 (range 2–9) compared with 8/10 (range 7–10, $p=0.053$).

All respondents considered that urology should be the responsible specialty when a hospital unit possessed both urology and general surgery emergency cover. With regards to paediatric patients presenting with suspected testicular torsion, opinion was divided; 57.1% considered that urology should be responsible, 19.0% paediatric surgery and 23.8% considered it to be dependent on the child's age. The critical age range varied from less than 2 years of age (7% of respondents), less than 5 years of age (12% of respondents), to less than 10 years of age (5% of respondents).

Trainees were asked to report in which training years they were required to assess patients (adult and paediatric) with suspected torsion. Regarding general surgery HSTs, 64.5% of their training placements (to current training point) involved the assessment of suspected torsion in both adults and paediatric patients, compared with 90.4% and 45.5% of urology HSTs in adult and paediatric patients, respectively. It was possible for general surgery HSTs to reach ST5 level before being required to assess any suspected torsion cases.

Both specialties commented that they had limited experience in paediatric surgery. Fewer than 20% of all HSTs had undertaken a formal paediatric surgical placement either at core or higher surgical training (Fig 2). Median confidence ratings in the management of suspected torsion in paediatric patients were higher among those HSTs who had undertaken a formal paediatric surgical placement (8/10) compared with those who had not (7/10, $p=0.33$).

Figure 2 Percentage of trainees who have carried out a formal paediatric surgical placement (CST, core surgical trainee; HST, higher surgical trainee; SHO, senior house officer).

Table 3 Service set-up for hospitals with National Training Number trainees within Wales.

Training hospital	Service set-up
A District general hospital	Urology responsible for suspected torsion patients
B Teaching hospital	Urology responsible for suspected torsion patients. However, no urology middle-grade cover after midday on weekends, so general surgical middle-grade cover responsible for assessment at these times ^a
C District general hospital	No urology emergency cover. General surgery responsible for suspected torsion patients
D District general hospital	No urology emergency cover. General surgery responsible for suspected torsion patients
E District general hospital	No urology emergency cover. General surgery responsible for suspected torsion patients
F District general hospital	No urology emergency cover. General surgery responsible for suspected torsion patients
G District general hospital	Urology emergency cover. General surgery responsible for suspected torsion patients
H Teaching hospital	Urology responsible for suspected torsion patients
I District general hospital	Urology responsible for suspected torsion patients
J District general hospital	Urology responsible for suspected torsion patients

^aAt time of survey distribution.

Approximately 35% of general surgery HSTs had experience of other paediatric surgical cases, compared with 9% of urology HSTs. General surgery HST paediatric experience included appendicectomy (all cases), undescended testes (6.4%), preputioplasty/circumcision (9.7%) and herniotomy (12.9%). One urology HST cited paediatric surgery experience for undescended testes, preputioplasty/circumcision and herniotomy.

Of the general surgery HSTs, 38.7% had undertaken a urology placement during core surgical training, but no difference was observed in the confidence in the management of suspected testicular torsion related to whether HSTs had or had not undertaken a urology training placement (7/10 vs 7/10 in adults, and 7/10 vs 7/10 in paediatrics).

Service set-up

The Wales Deanery currently has 10 hospital units providing acute surgical services with NTN HSTs in general surgery and/or urology. Data were extracted from the questionnaire to verify the service set-up at each hospital where NTN HSTs were based (Table 3).

Discussion

Treatment of suspected testicular torsion is time bound and untoward delay may likely result in life-changing testicular loss. The principal findings of this study were that general surgery HSTs received less than 50% of the operative exposure of urology HSTs in emergency scrotal surgery and were consequently 20% less confident in their assessment of suspected testicular torsion. Current service arrangements for the specialty responsible for the assessment of suspected torsion patients are often dictated by the presence or absence of urology emergency cover (at either middle grade or consultant level) but this was not

the case for all hospitals. Considering the crucial window from onset of symptoms and surgical exploration, patients should be assessed and surgery performed locally except in exceptional circumstances.² Our findings suggest important implications for curriculum competence development and ensuring patient safety, irrelevant of which hospital they are assessed at.

Scrotal exploration and management of suspected testicular torsion is within the curriculum of both general surgery and urology; however, the assessment of competence is not universal.^{10–11} There is a direct observation of procedural skills assessment within urology for testicular torsion but no method for assessment of operative competence in general surgery. Urology guidelines for the certificate of completion of training requires an indicative number of 50 scrotal cases and require the demonstration of one case at level 4 procedural based assessment (level 4 equating to the ability to competently perform the procedure unsupervised) but this can include elective hydrocele repair and epididymal cysts. No general surgery curricular have been designated for scrotal cases but HSTs are required to perform 60 inguinal hernia repairs and to demonstrate three level 4 procedural based assessments by three different trainer supervisors. General surgery HSTs declaring a specialist interest in general surgery of childhood are required to demonstrate three cases at level 3 procedural based assessments (level 3 equating to the ability to perform the procedure with minimal supervision) for paediatric orchidopexy, but few HSTs declare this interest. Moreover, it is possible for a general surgery HST to reach ST5 before being required to assess and operate on any suspected testicular torsion cases; and at general surgery ST5 most HSTs will have been assessed as competent to perform index operations such as appendicectomy, inguinal hernia repair and laparoscopic cholecystectomy.¹² It is therefore worrying

that a cadre of general surgery HSTs may not have been involved in acute scrotal assessment of until ST5 and theoretically require clinical supervision, despite being considered to be senior HSTs.

Both specialties reported limited experience in paediatric surgery; fewer than 20% of all HSTs had undertaken formal paediatric surgical placements. Median confidence ratings in the management of suspected torsion in paediatrics were higher among HSTs with defined paediatric surgical placement experience, but this was not statistically significant, probably because of the small numbers of HSTs who had formal paediatric surgical experience. Changes to the training environment have reduced the exposure for HSTs; a reduction in working hours, coupled with a more litigious culture, has made it challenging for trainees to gain experience. This is particularly true for conditions such as testicular torsion, which has been found to account for a significant proportion of successful claims in the UK.¹⁵ In response to such challenges the British Association of Urological Surgeons has introduced a five-day boot camp for new urology trainees. This course includes operative simulation of scrotal surgery and non-technical skills.¹⁴ This innovation has been very well received and has been shown to improve confidence. Ergo, it may arguably be beneficial for general surgery training programme directors to include simulation of the management of suspected testicular torsion within HST boot camps to improve technical skills and confidence in this regard.

This study has a number of inherent potential limitations. The data represent a single deanery experience, with results that will only be of direct relevance to UK deaneries that include a mixture of teaching, urban and rural district general hospitals within their training programmes. The data gathered were largely dependent on the accuracy with which trainees recorded ISCP operative activity. Given that limitation, the data form part of the annual review of competency progression process and, as such, demonstrates concordance with actual observations. The logbook results presented are for an entire cohort of nationally selected UK trainees and are allied with results of a survey distributed to the same cohort, with a respectable response. Together they provide allied and contemporary quantitative and qualitative data regarding the confidence and competence of general and urological surgery HSTs in the assessment and management of suspected testicular torsion.

Conclusion

In conclusion, general surgery trainees received less than 50% the operative exposure of urology trainees in emergency scrotal surgery and were less confident in their

assessment of patients with suspected testicular torsion. This presents clear important implications for curriculum competence development and patient safety. NHS trusts, university health boards and local education providers should review current arrangements for the management of acute scrotal surgery to ensure optimum patient safety and quality of care.

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