Management of Paediatric Testicular Torsion – Are we adhering to Royal College of Surgeons (RCS) recommendations

HS Thakkar, I Yardley, D Kufeji

Paediatric Surgery Department, Evelina London Children's Hospital, Guy's and St. Thomas' NHS Foundation Trust, London, UK

ABSTRACT

INTRODUCTION In 2015, the Royal College of Surgeons of England (RCS) commissioned the East Midlands Clinical Network to develop a set of guidelines for the management of paediatric torsion. Two quality measures identified were the provision of surgery locally where possible and 100% of explorations within three hours. We sought to assess the adherence to these quality measures within our referral network.

MATERIALS AND METHODS Retrospective data were collected for all paediatric scrotal explorations performed within our centre between January 2014 and July 2016. Patient demographics, sources of referral, transfer times, time to surgery and operative findings were obtained.

RESULTS A total of 100 patients underwent a scrotal exploration. Median age at presentation was 11 years (range 4 months to 15 years). Fifty-three per cent of referrals were from network hospitals. The median duration of symptoms was 25 hours (range 1–210 hours). The median transfer time from local centres was 120 minutes (range 45–540 minutes). The median time to theatre from the decision being made to operate was 60 minutes (range 30–600 minutes). Eighty-seven per cent of cases were explored within three hours. There were 13 cases of torsion with one orchidectomy. When taking into account the transfer time for external patients aged over five years without precluding comorbidities, exploration within three hours dropped to 18 of 46 (39%).

CONCLUSION The RCS guidelines recognise the need for specialist input in very young patients. A large proportion of explorations are, however, currently taking place in older patients with unacceptably long transfer times. We propose an extension of this review nationally to work towards the local provision of care for suitable patients.

KEYWORDS

Paediatric – Testicular torsion – Transfer – Local

Accepted 14 January 2018

CORRESPONDENCE TO

Hemanshoo Sudhir Thakkar, E: hemanshoo@gmail.com

Introduction

Testicular torsion is a surgical emergency that should always be considered when faced with an acutely painful scrotum. Age of presentation follows a bimodal distribution, with adolescent boys most commonly affected, followed by newborn infants.¹ Exploration within six hours of symptom onset has been shown to result in the highest salvage rates, confirming the urgency of assessment and definitive management.² In 2015, the East Midlands Clinical Network commissioned and facilitated a national guideline, the *Management of Paediatric Torsion* that was endorsed by the British Association of Paediatric Surgeons and the Royal College of Surgeons of England (RCS).³ Two quality measures included in this guideline were:

- > Provision of surgery locally where possible (except in those with precluding comorbidities and the very young).

- > 100% of explorations within three hours of making the decision to operate.

We sought to assess the adherence to these quality measures within our referral network and the implications for patients when these standards are not met.

Materials and methods

Our referral network spans the south-east of England with current agreements for all patients aged 13 years and above to be managed locally. We conducted a retrospective review of 100 consecutive paediatric scrotal explorations performed within our tertiary referral centre. Patients were identified using the Office of Population Censuses and Surveys code for 'exploration of scrotum' on our local theatre database. Owing to the specialist nature of surgical care of the newborn, scrotal explorations in neonates (less than 28

days) were excluded from this study. Patient demographics, sources of referral, transfer times, time to surgery and operative findings were recorded. For the purposes of further data analysis, the term ‘very young’ from the East Midlands clinical guideline⁵ was interpreted as patients aged less than 5 years of age.

Results

The median age at presentation was 11 years (range 4 months to 15 years). Sources of referrals were network hospital (53%), local accident and emergency department (31%) and genereral practitioner (14%). The median duration of symptoms at presentation to the first care provider was 25 hours (range 1 hour to 210 hours); 76% presented outside 6 hours and 24% within 6 hours. The median transfer time from the decision to refer from the local centre to arrival in our centre was 120 minutes (range 45–540 minutes). The median time to theatre from the definitive decision being made to operate was 60 minutes (range 30–600 minutes). Overall, 87% of cases were explored within three hours of this decision being made.

Eleven per cent (6/53) of patients that were transferred into our centre were above 13 years of age and, of these, two had a testicular torsion. One of these cases had an ischaemic testis on exploration but was deemed viable enough to prevent an orchidectomy. The other patient had

not suffered from any macroscopic ischaemia. As per the East Midlands commissioning guidelines, when taking into account the transfer time for patients referred into our centre for those aged above five years without precluding comorbidities, exploration within three hours dropped to only 18 of 46 (39%) of cases. Similarly, when taking into account our own network agreements, exploration within three hours dropped to 5 of 11 (45%; Fig 1).

The findings at exploration are summarised in Table 1. There were 13 cases of testicular torsion with one resultant orchidectomy. This patient was 14 years of age and presented to our local accident and emergency department with a 48-hour history of scrotal pain.

Discussion

The management of the paediatric acute scrotum is currently topical, with a particular emphasis on which provider should be delivering definitive care.⁵ Our primary aim was to assess the adherence of our referral network to guidelines commissioned in 2014 by the East Midlands Clinical Network.⁵ Some 55% of all scrotal explorations during the study period were performed in children from the referral network, with 83% of these patients aged above 5 years and 11% above 13 years of age.

The median duration of symptoms prior to presentation to the first care provider was 25 hours in our study. This is

Figure 1 Transfer times and time to theatre for all external referrals

Table 1 Findings at scrotal exploration

Diagnosis	Patients (%)
Torted appendage	52
Epididymo-orchitis	19
Testicular torsion	13
Bell-clapper anomaly	6
Other	6
Normal	4

consistent with the literature, whereby presentation has been found to be delayed, particularly in cases resulting in an orchidectomy.^{2,4} The median transfer time for these patients was two hours, with the longest transfer time being nine hours. Overall, one-third (4/13) of the cases of testicular torsion were found in patients who were transferred in with ages of 7, 10, 13 and 13 years, respectively. All these patients were fit and well and although none resulted in an orchidectomy, according to the guideline, their care could, and perhaps should, have been provided locally.

The *RCS Standards for Children's Surgery* (2013) and *Standards for Non-Specialist Emergency Surgical Care of Children* (2015) both emphasise the need for surgical care to be provided locally, where safe, and centrally where necessary.^{5,6} The time-critical nature of testicular torsion is universally accepted and, where possible, assessment and exploration should take place locally.^{3,5} In cases where this may not be deemed suitable, expedited transfer to a tertiary referral centre should be arranged.

On arrival at our tertiary referral centre, the guidelines recommend exploration within three hours of the decision being made to operate. This was achieved in nearly 90% of cases. The remainder of cases failed to meet this target largely due to a low index of suspicion for testicular torsion, with other emergency cases taking precedence. There was only one case of a testicular torsion explored at 3.5 hours from the decision to operate with a viable testis at exploration. However, when taking into account the transfer times for patients aged above five years of age with no precluding comorbidities, our three-hour exploration rate was nearly halved to 39% with the transfer time leading to significant delays in a large proportion of cases. A low overall rate of testicular loss, with only one orchidectomy in our series, and no apparent harm from transfer delays should not be a cause for complacency. The East Midlands clinical guidelines are based on evidence and clinical experience and the persistent failure to meet them requires urgent attention to reduce the risk of future harm. In line with the recommendations from the guideline, we encourage safe surgical care to be provided locally within the network. We strongly believe that one lost testis is one too many and, besides the litigation cost to the NHS, one must also consider the emotional, physical and psychological effect on the patient and their parents.

Anecdotally, the lack of paediatric anaesthetic cover is cited as one reason for transferring patients to a tertiary centre. However, the bigger dilemma is actually the current state of provision of children's services within district general hospitals and the supervision provided for adult general surgical and urology trainees. In 2010, a survey was published demonstrating a significant variation in operative practice among these two groups of trainees when exploring an acute scrotum.⁷ In line with the recommendations set out by the RCS, there is increasing expectation for general surgical and urology trainees to provide on-call cover for paediatric explorations with no consensus on which specialty should provide the corresponding consultant cover.^{8,9} In particular, the Association of Surgeons in Training emphasises the need for 'surgical specialty taking responsibility for the child to be clarified at an institutional level and not negotiated between on an ad-hoc basis'.⁹ Although we have formal network arrangements in place, in more than 10% of cases these have not been adhered to resulting in delayed patient transfers as well as a direct effect on the service provision capacity of the trust.

We recognise the limitations of our study being retrospective in nature. Our data collection was nonetheless complete in all cases, with a specific focus on the documentation of transfer times for all patient referrals. We do not have any data available on any explorations that are taking place in paediatric patients within our network hospitals, which would further guide our assessment of the adherence to our agreements. Furthermore, we do not have any insight into the number of children presenting with an acute scrotum who do not undergo surgical exploration. Those who were transferred into our centre universally underwent exploration, but this is a selected group of patients who have already had surgical assessment elsewhere. Similarly, those presenting directly to our unit via the emergency department will have passed through a layer of assessment before referral to our surgical service and so the high rates of exploration in these boys may not be representative of all boys presenting with scrotal pain.

It is notable that only 13% of scrotal explorations in our series revealed a testicular torsion, the diagnosis that warrants emergent scrotal exploration. Even when those with 'bell-clapper' testicles, suggesting a possible torsion and then spontaneous de-torsion as the cause of the symptoms, are included, fewer than one in five scrotal explorations were in fact treating testicular torsion. The standard surgical dictum is that the acute scrotum should always be explored surgically as a matter of urgency, as it is not possible to exclude testicular torsion clinically with 100% certainty.^{10,11} However, perhaps this low rate of confirmed torsion should be cause to reconsider this approach and take a more surgically conservative approach and explore other means of investigation, such as diagnostic imaging, where the index of suspicion for torsion is low.¹² Nonetheless, from a medicolegal perspective, missed testicular torsion still accounts for a significant proportion of successful claims made against the NHS, which is likely to continue to fuel the need for urgent surgical exploration.^{13,14} Between 1995 and 2009, missed testicular torsion was the

most common cause cited by the NHS Litigation Authority for successful claims related to non-operative events.¹⁴

Conclusion

In conclusion, as a tertiary referral centre, we are still performing a significant number of scrotal explorations in older boys that should be managed locally, creating unnecessary delays in treatment and unnecessary pressure on the ability to provide acute specialist paediatric surgical care. Our future recommendation would be to conduct a prospective national audit assessing the current trends in service provision across the UK. Furthermore, we intend to discuss our findings within our network to encourage and support the notion of care to be provided locally where possible reducing unnecessary delays in receiving timely surgical care.

References

1. Bowlin PR, Gatti JM, Murphy JP. Pediatric testicular torsion. *Surg Clin North Am* 2017; **97**(1): 161–117.
2. Pogorelić Z, Mustapić K, Jukić M *et al.* Management of acute scrotum in children: a 25-year single center experience on 558 pediatric patients. *Can J Urol* 2016; **23**(6): 8,594–8,601.
3. NHS East Midlands Clinical Network. *Commissioning Guide: Management of Paediatric Torsion*. London: Royal College of Surgeons of England; 2016.
4. Molokwu CN, Somani BK, Goodman CM. Outcomes of scrotal exploration for acute scrotal pain suspicious of testicular torsion: a consecutive case series of 173 patients. *BJU Int* 2011; **107**(6): 990–993.
5. Children's Surgical Forum. *Standards for Children's Surgery*. London: Royal College of Surgeons of England; 2013.
6. Royal College of Surgeons of England. *Standards for Non-Specialist Emergency Surgical Care of Children*. London: Royal College of Surgeons of England; 2015.
7. Tydeman C, Davenport K, Glancy D. Suspected testicular torsion – urological or general surgical emergency? *Ann R Coll Surg Engl* 2010; **92**(8): 710–712.
8. Harries RL. Letter regarding urology cross cover. London: Association of Surgeons in Training; 2015. <https://www.asit.org/resources/archived-articles-documents/letter-regarding-urology-cross-cover/res1028> (cited January 2018).
9. Mohan H, Healy C, Gokani V, Harries RL. *Response to RCS Standards for Non-Specialist Emergency Surgical Care of Children 2015 Consultation Document: A statement from ASiT*. London: Association of Surgeons in Training; 2015. <https://www.asit.org/resources/archived-articles-documents/response-to-rcs-re-emergency-paediatric-surgery-june-2015/res1034> (cited January 2018).
10. Eardley I. Testis and scrotum. In Williams N, Bulstrode CJK, O'Connell PR, eds. *Bailey and Love's Short Practice of Surgery*. 26th edition. Boca Raton, FL: CRC Press; 2013. pp1377–1391.
11. Jefferies MT, Cox AC, Gupta A, Proctor A. The management of acute testicular pain in children and adolescents. *BMJ* 2015; **350**: h1563.
12. DaJusta DG, Granberg CF, Villanueva C, Baker LA. Contemporary review of testicular torsion: new concepts, emerging technologies and potential therapeutics. *J Pediatr Urol* 2013; **9**(6 Pt A): 723–730.
13. Raine JE. An analysis of successful litigation claims in children in England. *Arch Dis Child* 2011; **96**(9): 838–840.
14. Osman NI, Collins GN. Urological litigation in the UK National Health Service (NHS): an analysis of 14 years of successful claims. *BJU Int* 2011; **108**(2): 162–165.