Original Article

Blunt trauma to scrotum in men with spinal cord injury after they had completed rehabilitation in a spinal unit

S Vaidyanathan^{*1}, BM Soni¹, G Singh¹, R Subramaniam², J Bingley¹, P Sett¹ and KF Parsons³

¹Regional Spinal Injuries Centre, District General Hospital, Southport, Merseyside PR8 6PN, UK; ²Department of Radiology, District General Hospital, Southport, Merseyside PR8 6PN, UK; ³Department of Urology, Royal Liverpool University Hospitals, Liverpool L7 8XP, UK

Study design: A report of three men with spinal cord injury (SCI) who sustained blunt trauma to scrotum after they had completed rehabilitation in the spinal unit.

Objectives: To raise awareness amongst health professionals regarding:

- mechanism of scrotal trauma in men with SCI
- need for prompt assessment of scrotal injury
- measures to be taken by men with SCI and their carers to prevent injury to the scrotum.

Setting: Regional Spinal Injuries Centre, Southport, England.

Case reports:

- A 31-year-old with C-6 tetraplegia sustained traumatic haematocoele as he squashed his right testis while he jumped on to a toilet seat in a hurry for bowel movement.
- A 28-year-old male with T-7 paraplegia sat on his left testis while transferring on to a car seat.
- A boxer dog jumped on to the scrotum of a 40-year-old male with T-8 paraplegia, while he was lying on his bed.

Conclusions: Men with SCI are at high risk of sustaining trauma to scrotum during transfers. The scrotum may be squashed by the weight of the body during transfers, or the scrotum may be trapped between the thighs or under the torso. Men with SCI or their carers should check after each transfer that the scrotum is not trapped between the thighs or under the torso. The health professionals should encourage men with SCI to update their transfer skills at regular intervals in order to prevent trauma to the scrotum during transfers. Blunt trauma to scrotum requires prompt evaluation by ultrasonography so that appropriate treatment can be instituted without delay.

Spinal Cord (2001) 39, 442–448

Keywords: spinal cord injury; testis; scrotum

Introduction

Men with spinal cord injury (SCI) are liable to sustain blunt trauma to scrotum during their routine activities such as transfers (eg from the chair to toilet seat or car seat and vice versa) or, during physiotherapy. The scrotum may be squashed by the weight of the body during transfers, or the scrotum may be trapped between the thighs or under the torso. Men with spinal cord injury may also develop abrasions over the scrotum if the scrotum is dragged over hard surface during transfers (Figure 1).

Ragozzino¹ reported a 40-year-old athlete, who developed intra-testicular haematoma as a result of testicular compression while performing stretching

exercises for the lower back during physiotherapy, when one knee was brought to the chest and restrictive gym shorts were worn. Patients with spinal cord injury undergo extensive physiotherapy during their rehabilitation. Testicular compression may occur inadvertently while performing gymnastics or, the testis may be squeezed between the thighs during a bout of violent spasm of the lower limbs. Further, men with spinal cord injury may sustain repeated minor sub-clinical trauma to the scrotum as they ride their chairs for many years. Shocks from rough terrain, and vibrations of the seat may cause repeated micro-trauma to the perineum and scrotum, similar to sub-clinical micro-traumatisation of the scrotal contents in mountain bikers.²

*Correspondence: S Vaidyanathan, Regional Spinal Injuries Centre, District General Hospital, Town Lane, Southport, PR8 6PN, UK

Figure 1 Photograph of the scrotum of a 28-year-old male with paraplegia. There is extensive abrasion of the skin of the scrotum

We describe three men with SCI, who sustained blunt trauma to scrotum during their routine activities of daily living. We were unable to find any report of blunt trauma to the testis and scrotum of men with spinal cord injury in the Medline database. We hope that the presentation of these three cases will lead to increased awareness amongst health professionals regarding:

- *mechanism of scrotal trauma* in men with SCI
- need for *prompt* assessment of scrotal injury
- measures to be taken by men with SCI and their carers to *prevent* injury to the scrotum.

Case reports

Case 1

A 31-year-old male sustained C-6 complete tetraplegia in a diving accident about 7 years ago. He had two symmetrical, normal sized, testes located in the scrotum. For bowel evacuation, he was given an enema in the bed. Then he jumped on to the toilet seat in a hurry to empty his bowel. During this transfer, he crushed both testes. This happened in the morning and by evening, he noticed that the scrotum was swollen to the size of a pumpkin. He was sweating profusely. He had increased spasms. He could not wear a sheath as the penis was buried in the hugely swollen scrotum. He had to go back to urethral catheter drainage. He felt sick as well. Although he and his partner were concerned about the consequences of scrotal trauma, especially in terms of fertility, there was a delay in assessment of the extent of injury. Ultrasonography of scrotum was performed 10 days later. This revealed organising right haematocoele (Figure 2a). As the injury was already 10 days old, a decision was taken against surgical

evacuation of the haematocoele. By 2 weeks, the scrotal swelling had become smaller (Figure 2b). His spasms had subsided, and he felt better in himself. An ultrasound scan of scrotum, performed 17 days after the initial scan, showed almost complete resolution of the right haematocoele; the right testis appeared normal (Figure 2c).

Case 2

A 28-year-old male sustained T-7 complete paraplegia in a motor bike accident 7 years ago. He had two symmetrical, normal sized, testes in the scrotum. While transferring himself on to the car seat from his chair, he sat on his left testis. He developed spasm of abdominal muscles and realised that something was amiss. He was in the habit of checking his scrotum after every transfer. Therefore, he recognised that he had sat on his testis and rectified the situation promptly. However, he noticed a swelling of the left testis at night when he was going to bed. There was a delay in the assessment of the extent of the injury. Over the next 5 weeks, the swelling of the left side of the scrotum gradually became smaller (Figure 3a). Ultrasonography was performed 6 weeks after he had sustained blunt trauma to the scrotum. This revealed normal testis and epididymis on both sides. There was moderate-sized hydrocele on the left side (Figure 3b). Four months later, he underwent Lords procedure for the hydrocele.

Case 3

A 40-year-old male sustained T-8 complete paraplegia in a motor cycle accident 5 years ago. He was managing his bladder by intermittent catheterisation. As he was lying on his bed in his home, a boxer dog weighing about four stones jumped on to his scrotum. At that time he developed spasm of his abdomen. Subsequently, he noticed swelling of the left side of his scrotum. The extent of the injury was evaluated by ultrasonography, which was performed 5 days after the trauma. The ultrasound examination showed enlarged left epididymis containing mixed echo pattern with highly reflective area. The left testis was enlarged; no focal lesion was seen within the testicular parenchyma (Figure 4a). With a diagnosis of traumatic epididymitis and orchitis, he was advised conservative management. A follow-up scan of scrotum performed 3 weeks later showed marked improvement in the ultrasonic appearance of the testis and epididymis; but the resolution was not yet complete (Figure 4b).

Discussion

Need for early assessment of blunt trauma to scrotum: Sonography and MRI

Men with spinal cord injury are at increased risk for blunt trauma to the scrotum. The extent of injury

Figure 2 (a) Ultrasound of the scrotum in a 31-year-old male (Case 1) shows organising haematocele. (b) Clinical photograph of the bruised scrotum in a tetraplegic patient who sustained severe blunt injury to the scrotum while transferring himself on to a toilet seat 2 weeks earlier (Case 1). (c) Follow-up ultrasound scan of the scrotum shows almost complete resolution of the haematocele

Figure 3 (a) Clinical photograph of the scrotum of a 28-year-old male who sustained blunt trauma to the scrotum during transfer to a car seat 5 weeks earlier (Case 2): left side of the scrotum is swollen in contrast to normal appearance on the right side. (b) Ultrasonography of the scrotum shows moderate sized hydrocele (H) on left side. The testis (T) and epididymis appear normal

should be assessed as soon as possible by imaging techniques so that appropriate treatment is provided without delay. The consensus is that ultrasound is the primary imaging tool. MRI is useful as an adjunct in case of indeterminate sonogram. Sono-

graphy showed high sensitivity (90%) in detecting testicular disease, but its specificity (55%) was disappointing.³ The possibility of showing tunica albuginea, of imaging testes in various planes, and its diagnostic accuracy of about 88% as well as the lack of ionising radiation make MRI the most reliable form of diagnostic imaging in the classification of scrotal pathology.⁴ Cramer and associates⁵ showed that *MR imaging, despite its high cost, was a useful aid for diagnosis, in cases of indefinite findings in scrotal ultrasound.*

Spectrum of injuries to the testis and epididymis following blunt trauma to scrotum

As men with SCI are more susceptible to sustain blunt trauma to the scrotum, physicians providing care to SCI patients should be familiar with the spectrum of injuries which may result from blunt trauma to scrotum. The lesions which may result from blunt trauma to the scrotum are listed below. These can occur either alone, or in any combination.

- Abrasion of the scrotal skin (Figure 1)
- Hydrocele
- Haematocele
- Traumatic epididymitis⁶
- Traumatic orchitis
- Subcapsular haematoma in the testis
- Contusion of the testis
- Rupture of the testis
- Intra-testicular pseudoaneurysm⁷
- Testicular dislocation⁸

During a period of 3 months, we encountered blunt trauma to the scrotum in three men with SCI: traumatic haematocele in one case, traumatic epididymitis and orchitis in another and, hydrocele in the third patient. We may infer that blunt trauma to the scrotum in men with spinal cord injury may not be uncommon; probably, the occurrence of blunt trauma to the scrotum is under-reported in men with spinal cord injury.

Management of blunt trauma to the scrotum

When the extent of injury is assessed promptly by imaging techniques, appropriate treatment should be instituted without delay. The goal is to preserve testicular tissue and to prevent further damage to testis. Up to 80% of hematoceles, are associated with testicular rupture.⁹ Haematoma in the tunica vaginalis sac is usually under pressure. Altarac¹⁰ recommended that haematocele should be explored, preferably by direct access though a scrotal incision. The tunica vaginalis should be opened. Haematoma should be evacuated and the testis should be examined. If imaging studies had shown intra-testicular haematoma, the tunica albuginea should be opened and haematoma evacuated. Every effort should

Figure 4 (a) Case 3: Ultrasonography of the scrotum shows enlarged left epididymis containing mixed echo pattern with highly reflective area. Left testis is enlarged; there is no focal lesion within the testicular parenchyma. The features are consistent with traumatic epididymitis and orchitis. (b) Follow-up ultrasound scan of the scrotum performed 3 weeks later, shows marked improvement in the ultrasonic appearance of the testis and epididymis

be made to conserve spermatogenetic tissue. The necrotic tissue should be excised and tunica albuginea approximated. If the tunica albuginea cannot be closed, the defect can be covered with a patch of tunica vaginalis.

In Case 1, who developed haematocoele following blunt trauma to the scrotum, a conservative approach was adopted because of delay in diagnosis. Luckily for him, an ultrasound scan, which was performed 17 days later, showed almost complete resolution of the haematocoele, and the testis appeared normal. However, testicular volume needs to be measured by serial ultrasound scans in order to find out whether there is delayed atrophy of the testis.

Consequences of blunt trauma to the scrotum

Scrotal trauma may result in testicular atrophy. Atrophy of a testis may be very distressing especially to young spinal cord injury patients and their partners. Cross and associates¹¹ defined testicular atrophy as a reduction to 50% of the volume of the uninjured testis when measured by ultrasonography, performed with a linear array transducer operating between 7.5 and 10 MHz. These authors detected testicular atrophy in 50% of patients who had sustained blunt trauma to the scrotum. The time elapsed between trauma and follow-up sonography varied from 2–81 months. The following factors contribute to the development of testicular atrophy after blunt trauma to scrotum:

- Resorption of non-viable testicular tissue
- Ischaemia due to raised pressure within the tunica as a result of the haematocele.

Prompt evacuation of haematocele and subcapsular haematoma when present, will relieve the raised pressure and decrease the chances of testicular atrophy in a spinal cord injury patient who had sustained blunt trauma to the scrotum.

The fertility of spinal cord injured men is already severely impaired due to ejaculatory dysfunction and poor semen quality.¹² The ratio of dead-to-live immotile sperm in spinal cord injured men was more than double that in normal men (7:3 *versus* 3:7).¹³ Biopsy of testis in men with SCI showed that spermatogenesis was normal in only 28 of the 50 patients with paraplegia. Hypospermatogenesis was observed in 15, maturation arrest at the spermatid stage in six and, maturation arrest at the spermatocyte stage in one of the 22 abnormal cases.¹⁴ Therefore, it is of paramount importance to prevent testicular atrophy in spinal cord injury patients who had sustained blunt trauma to the scrotum. This requires prompt assessment of the extent of trauma, and evacuation of haematoma when indicated.

In order to provide good quality service to persons with spinal cord injury, adequate beds should be made available in the spinal injury centres for re-admissions.¹⁵ Thus spinal units should gear up for emergency admission of patients who have sustained acute spinal cord injury as well as for re-admissions of spinal cord injury patients who have now developed an acute illness such as acute chest infection, acute urinary infection or, blunt trauma to the scrotum.

Prevention of blunt trauma to the scrotum in men with spinal cord injury

Men with spinal cord injury or their carers should check the scrotum after each transfer. This will ensure that the scrotum is not trapped between the thighs or under the torso. Serious damage to the testis was averted in Case 2, as he was in the habit of checking his scrotum after every transfer. Case 1 squashed his scrotum as he hurriedly transferred himself on to a toilet seat. This illustrates the need to encourage men with SCI to update their transfer skills at regular intervals after they had completed rehabilitation in a spinal unit. Such a step will hopefully prevent blunt trauma to the scrotum sustained during transfers, as happened in Case 1.

Boss and associates¹⁶ studied 48 persons with spinal cord injury from two Veterans Affairs Medical Centres and a state university affiliated rehabilitation program in the USA. In general, spinal cord injury patients retained both the cognitive information and functional skills, eg transfer, learned in the acute rehabilitation setting and also continued to learn after discharge in both cognitive information and functional skills. Transfer skills can be discussed and reviewed when

persons with spinal cord injury attend the spinal units for annual follow-up.

Valuable information regarding transfer skills for spinal cord injury patients is available at the University of Miami web site: <http://calder.med.miami.edu/pointis>. Practical advice is provided in the web site: <http://calder.med.miami.edu/pointis/sciman.html> on the following subjects: (i) Even Transfers; (ii) Uneven Transfers; and (iii) Bathroom and Vehicle Transfers.

Conclusion

Men with spinal cord injury are susceptible to sustain injury to the scrotum while performing routine activities such as transfers from the chair to toilet seat or car seat and vice versa. Men with SCI or their carers should check after each transfer that the scrotum is not trapped between the thighs or under the torso. The health professionals should encourage men with SCI to update their transfer skills at regular intervals in order to prevent trauma to the scrotum during transfers. Blunt trauma to the scrotum requires prompt evaluation by ultrasonography so that appropriate treatment can be instituted without delay.

Acknowledgement

Our gratitude to Hugh Potter and Company, Serious Injury Solicitors, Manchester, England, for sponsoring the printing of colour illustrations.

References

- 1 Ragozzino MW. Stretcher's scrotum. *N Engl J Med* 1993; **328**: 815.
- 2 Frauscher F *et al*. Subclinical microtraumatisation of the scrotal contents in extreme mountain biking. *Lancet* 2000; **356**: 1414.
- 3 Derouet H *et al*. Nuclear magnetic resonance tomography for improving the differential diagnosis of pathologic changes in the scrotal contents. *Urologe A* 1993; **32**: 327–333.
- 4 Derouet H *et al*. Magnetic resonance tomography in the differential diagnosis of pathologic changes in scrotal contents—a comparison with computed tomography. *Rofo Fortschr Geb Rontgenstr Neuen Bildgeb Verfahr* 1991; **155**: 436–441.
- 5 Cramer BM, Schlegel EA, Thueroff JW. MR imaging in the differential diagnosis of scrotal and testicular disease. *Radiographics* 1991; **11**: 9–21.
- 6 Gordon LM, Stein SM, Ralls PW. Traumatic epididymitis: evaluation with color Doppler sonography. *AJR Am J Roentgenol* 1996; **166**: 1323–1325.
- 7 Dee KE, Deck AJ, Waitches GM. Intratesticular pseudoaneurysm after blunt trauma. *AJR Am J Roentgenol* 2000; **174**: 136.
- 8 Shefi S, Mor Y, Dotan ZA, Ramon J. Traumatic testicular dislocation: a case report and review of published reports. *Urology (Online)* 1999; **54**: 744.

- 9 Choe JM, Battino B. Testicular trauma. Testis-trauma eMedicine Online Text—Medicine, Ob-Gyn, Psychiatry and Surgery. htm. Last updated on 10/17/2000.
- 10 Altarac S. Management of 53 cases of testicular trauma. *Eur Urol* 1994; **25**: 119–123.
- 11 Cross JJ, Berman LH, Elliott PG, Irving S. Scrotal trauma: a cause of testicular atrophy. *Clin Radiol* 1999; **54**: 317–320.
- 12 Sonksen J, Biering-Sorensen F. Semen quality in the same man before and after spinal cord injury. Case report. *Paraplegia* 1994; **32**: 117–119.
- 13 Brackett NL, Bloch WE, Lynne CM. Predictors of necrospemia in men with spinal cord injury. *J Urol* 1998; **159**: 844–847.
- 14 Elliott SP et al. Testis biopsy findings in the spinal cord injured patient. *J Urol* 2000; **163**: 792–795.
- 15 Vaidyanathan S et al. A review of the readmissions of patients with tetraplegia to the Regional Spinal Injuries Centre, Southport, United Kingdom, between January 1994 and December 1995. *Spinal Cord* 1998; **36**: 838–846.
- 16 Boss BJ, Pecanty L, McFarland SM, Sasser L. Self-care competence among persons with spinal cord injury. *SCI Nurs* 1995; **12**: 48–53.