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ORIGINAL ARTICLE

The dangers of hurling—genital injuries arising in the modern game

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Abstract

Objective To assess the proportion of penoscrotal injuries arising from the sport of hurling and to assess work-up and management of each injury.

Methods Using Hospital In-Patient Enquiry data, all penoscrotal injuries occurring over a 10-year period between 2007 and 2017 were identified and assessed. Chart review, imaging reports, operative notes and discharge summaries were used to identify the aetiology of each injury and those occurring due to hurling were selected for analysis. Investigations and management of each case were reviewed.

Results Seventy patients presented to our institution over a 10-year period with penoscrotal injuries and, of these, ten patients (14%) presented with injuries arising due to blunt scrotal trauma whilst playing hurling. The average age of these patients was 24.3 years, and the right testicle was injured six times, compared with the left testicle twice and isolated scrotal injuries twice also. One hundred percent of patients underwent diagnostic ultrasonography with Doppler flow assessment with 90% ($n = 9$) having positive findings. Three patients (33%) required operative management with only one patient (10%) requiring an orchidectomy. There were no delayed or interval procedures.

Conclusion Hurling is a physical sport with a notable proportion of blunt scrotal trauma arising due to the sport. Prompt physical examination and diagnostic ultrasonography are essential in investigations of injuries, and surgical exploration should be considered in all cases with concerns of testicular survival. Groin protection should be recommended to all players and in particular to those at high risk such as single testis or prior injury.

Keywords Groin protection · Hurling · Scrotal trauma · Testicular trauma

Introduction

Hurling, one of the oldest field games in the world, dates back over 3000 years in Ireland and had formal rules and regulations established in 1884 with the formation of the *Gaelic Athletic Association* [1]. The game is played with a sliotar, a cork ball covered in stitched leather weighing between 110 and 120 g, which is struck with a hurley, a wooden stick carried by players [2]. Over 330,000 players are officially registered to play the sport across 2126 clubs in Ireland; however, with increasing popularity abroad, there are almost 400 further clubs across the world [3].

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Injuries are common in the sport of hurling, either from ball strike or hurley strike [4]. When struck, the sliotar can reach speeds of up to 160 km/h which, considering the size of the ball (diameter 7 cm), poses significant injury risks if inadvertently aimed at another player [4]. Players traditionally do not wear any protective clothing, with protective helmets and faceguards only made compulsory for all players in 2010 [2]. In fact, in a study in 1996 which prospectively assessed hurling injuries, it found that over 50% of players did not wear any form of physical protection at all [5].

Testicular injuries, specifically, are uncommon in team and individual sports and, thus far, have not yet been analysed in relation to hurling. A study in the USA involving over 5400 sports-related injuries arising in the National Paediatric Trauma Registry encountered no testicular injuries at all [6]. When they did occur, as reported in other studies, the majority of testicular injuries (48%) was reported in the sport of lacrosse [7].

The aim of our study was to identify the proportion of male genital trauma in a tertiary referral centre in the southeast of Ireland arising due to hurling over a 10-year period, as well as

assessment of the investigations and management of each injury. Approximately 6000 players (children and adults) are involved in the game of hurling in the region served by the hospital in this study [2].

Methods

The hospital's patient data capturing system, Hospital In-Patient Enquiry (HIPE), was used to identify patients for this study. Search terms including "penile", "scrotal", "testicular" and "genital" injuries were used to identify any patient who presented to our institution with a diagnosis of genital, penile or scrotal wounds, injuries or trauma. Injuries occurring as part of poly-trauma were included in the initial search. A 10-year period from 2007 until 2017 was selected for analysis.

Once suitable patients were identified, a combination of information sources was utilised to further characterise the nature of each injury. Inpatient notes were used to define the patient age, presenting complaints, timing of presentation and nature of each injury. Imaging reports were used to assess if imaging was performed and to clarify the radiological extent of injury. Operative reports, where applicable, were used to assess exactly what operative intervention was required. Discharge summaries as well as subsequent outpatient letters were used to define follow-up and clarify subsequent patient progress. When performed, ultrasound reports were used to assess for post-injury testicular atrophy. All injuries arising from playing hurling were identified and selected for analysis.

Results

A total of 70 patients presented with penile, testicular and/or scrotal injuries to our institution over a 10-year period—see Fig. 1. Of these, ten patients (14%) experienced blunt trauma whilst playing hurling specifically and were selected for analysis. With regard to presenting complaint, all patients (100%) presented with scrotal or testicular pain, and nine (90%) complained of scrotal swelling also. Nine of these injuries (90%) were due to ball (sliotar) strike and the remaining injury due to hurl strike (10%). All injuries involved the scrotum or testicle with no penile injuries encountered. Seven patients presented during "normal" working hours, 9 am–5 pm, and the remainder presented between 5 pm–12 am. The average age of the patients presenting with such injuries was 24.3 years (range 10–37). The right testicle was involved six times, compared with the left testicle which was injured twice and isolated scrotal injuries occurring twice also.

All of our patients (100%) had a testicular ultrasound performed with 90% ($n = 9$) returning abnormal findings. No other imaging modalities were used as work-up of injuries. Findings ranged from a testicular contusion to intratesticular haemorrhage with absent testicular blood flow. The majority of our patients were managed conservatively, with 30% ($n = 3$) requiring operative management. Of these patients requiring an operation, only one required an orchidectomy for a devitalized and grossly contaminated testicle. The remaining two patients who required operations required scrotal exploration only. A summary of the investigations and management of patients involved is summarised in Table 1. Of the seven patients who were managed conservatively, three underwent subsequent ultrasonography at an interval ranging from 4 to

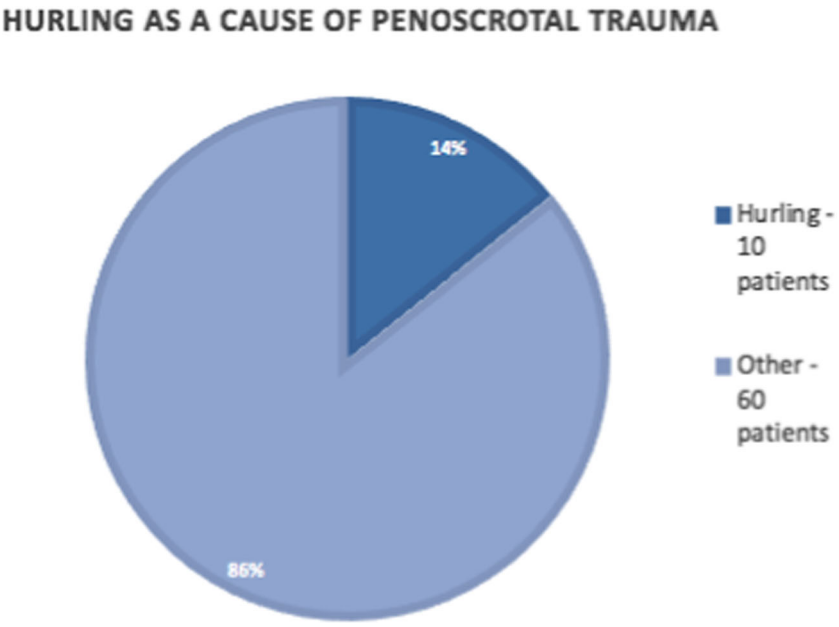

Fig. 1 Graphical representation of penoscrotal injuries due to hurling

Table 1 Summary of presentation, investigations and management of hurling injuries

Age	Cause	Ultrasound?	Ultrasound findings	Management	Side affected
10	Hurl strike	Yes	Scrotal free fluid	Conservative	Right
14	Ball strike	Yes	Normal	Conservative	Right
25	Ball strike	Yes	Contusion	Conservative	Left
28	Ball strike	Yes	Testicular contusion with intrascrotal haematoma	Conservative	N/A
30	Ball strike	Yes	Scrotal haematoma	Conservative	Right
36	Ball strike	Yes	Testicular contusion	Conservative	Left
37	Ball strike	Yes	Scrotal haematoma	Conservative	N/A
18	Ball strike	Yes	Paratesticular haematoma	Exploration	Right
20	Ball strike	Yes	Right testicular fracture and haematoma	Exploration	Right
25	Ball strike	Yes	Intratesticular haemorrhage, no testicular blood flow	Orchidectomy	Right

6 weeks following discharge. One patient's ultrasound was reported as normal whilst the further two patients had mild testicular atrophy of the affected testicle.

By means of comparison, there were eight further patients, with an average age of 22.2 years (8–41), during the same 10-year period with injuries due to alternative sports. One patient presented with penile pain and bruising after being struck by a golf ball. This penile contusion was managed conservatively without imaging or operative intervention. Seven patients presented with scrotal or testicular pain and swelling. These injuries arose due to Gaelic football ($n = 2$), soccer ($n = 2$), rugby ($n = 1$), golf ($n = 1$) and tennis ($n = 1$). All patients received diagnostic ultrasonography with findings including scrotal haematoma ($n = 3$), testicular contusion ($n = 3$), intratesticular haematoma ($n = 1$) and testicular devitalisation ($n = 1$). The latter two injuries occurred due to golf ball strike and rugby ball strike, respectively. Both these patients required operative intervention with a partial orchidectomy and orchidectomy being performed respectively.

Discussion

Genital trauma is predominantly blunt in nature (approximately 80%) and accounts for one to two thirds of all urological traumas, affecting males much more frequently than females [8]. Injuries may include testicular dislocation, testicular haematocele/haematoma, testicular rupture and scrotal haematoma. It has been reported than a force of 50 kg is required to achieve testicular rupture which, according to the literature, can occur in up to 50% of blunt scrotal trauma cases [9, 10]. Blunt trauma causing testicular rupture can negatively impact fertility due to impaired spermatogenesis from development of anti-sperm antibodies as well as testicular volume loss, thus should be managed promptly and deftly [11].

Hurling-related penoscrotal injuries should be managed expeditiously as with all urological traumas. European Association of Urology (EAU) guidelines recommend testicular ultrasonography to assess for injury, as well as colour Doppler-duplex to assess testicular perfusion [8]. Urgent scrotal exploration is indicated in the treatment of imaging-confirmed rupture to repair the tunica albuginea [8]. Conservative management of haematoceles or haematomas is generally possible depending on size. Surgical management is recommended if the haematocele is more than three times the size of the contralateral testicle, with or without the presence of testicular rupture or contusion [8]. Although European Association of Urology and American Urological Association (AUA) guidelines recommend emergent scrotal exploration for blunt trauma as described, one noteworthy study retrospectively analysing blunt scrotal trauma had successful results in non-operatively managing 37 cases, with four cases of subsequent testicular atrophy and concluded that conservative management of blunt scrotal trauma is safe and may reduce risk of testicular atrophy [12].

Injuries due to the sport of hurling in general are well documented and occur more frequently than any other sport involving the use of sticks such as lacrosse, shinty or ice hockey [4]. Hurling injuries are far more likely to occur during match play than during training periods [4]. Fingers, followed by hamstrings, are the most commonly documented sites of injury, with the most common cause being due to foul play [5]. Over 9% of sports-related spinal injuries in Ireland occurred whilst playing Gaelic football or hurling [13]. Following a successful yet prolonged introduction of mandatory face and head protection for players in the form a helmet with face guard in 2010, a reduction in head trauma of 51 to 5% in injured players was achieved [14]. The success of this campaign in reducing significant hurling-related head injuries is of major importance in ensuring player welfare and begs the question if similar reduction in hurling-associated urogenital injuries can be achieved with routine wearing of groin protection.

There is no evidence published regarding the efficacy of athletic cups or groin protection in reducing testicular injury due to any sporting activity. Despite this, a majority (78%) of baseball players report wearing them, as their use remains logical in scrotal injury prevention [15]. In sports where self-reported cup use is higher, such as lacrosse and baseball, the reason for high usage seems to stem from increased social acceptance.

Despite potentially devastating injuries, a survey of over 700 high school and college students in the USA reported athletic cup use for genital protection in only 12.9% of all athletes [7]. Only 20% of all athletes with prior injuries reported they were now wearing a cup following their injury, suggesting poor adherence [7].

Barriers to regular use of groin protection have been reported as including lack of owning an athletic cup, lack of knowledge and social image associated with their use [7]. Considering no hurling players in Ireland are reported to be currently using athletic cups, it would be assumed that integrating routine athletic cup use may therefore prove difficult. Therefore, targeting young player education as well as encouraging groin protection use among senior or prolific players may aid in increasing usage among younger players. The potential implications for fertility mean that all penoscrotal injuries require prompt attention and deft management; however, it is of course more prudent to aim to prevent injuries occurring in the first place rather than to treat them.

The limitations of this study are the paucity of numbers over the 10-year period to make a robust-concluding recommendation on the routine wearing of groin protection whilst playing hurling. Although its use remains intuitive, there were only three scrotal explorations including one orchidectomy in this cohort over a 10-year period; therefore, a randomised controlled trial would be impractical. Expanding the study to further tertiary referral centres in Ireland to increase the population cohort would be of interest. Furthermore, as there have not been any previous studies assessing this topic, the current attitudes of hurling players and coaches towards wearing groin protection are unknown, with assumed low usage rates. The authors recommend future study analysis of current attitudes towards wearing groin protection with a view towards highlighting potential barriers to routine usage.

Conclusion

The results of this study show that a notable proportion of all penoscrotal traumatic injuries are sustained whilst playing hurling. Thankfully, despite the physicality of the game and the high speed of ball flight, the majority of injuries (70% in this study) were managed conservatively. From our study, one third of those requiring surgical management of injury (10% in total) ended up requiring an orchidectomy. The cornerstone of management of these traumas is prompt physical examination, urgent testicular ultrasonography with Doppler flow assessment and exploration of all open wounds or potential testicle-threatening injuries.

Considering the major success of reducing head injuries due to the mandatory introduction of helmet and face protection whilst playing hurling, this study highlights the potential opportunity for prevention of devastating penile and testicular injuries with the recommendation of groin protection. Overcoming social acceptance by introducing these from a young age or promoting use in senior players may help increase uptake. Use should certainly be encouraged in those at particular risk such as players with a single testicle, or prior injury.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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