Sports Hernia: A Bilateral Disease

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Abstract

Background  Groin pain in athletes is a common source of frustration for the athlete and the treating physician. Sports hernia is one type of groin injury that can be very debilitating. Sports hernia is defined as chronic, activity related groin pain which has been unresponsive to conservative therapy and is caused by a variety of anatomic injuries to posterior wall, conjoint tendon abdominal musculature and adductor muscle origin complex.

Methods  A total of seventy five patients underwent a laparoscopic total extraperitoneal approach (TEP) for sports hernia between June 22, 2007 and August 31, 2012. A retrospective chart review was performed.

Results  Of the seventy five patients, bilateral attenuation of the posterior floor was noted in seventy four athletes (98.7%). Unilateral findings were demonstrated in just one patient (1.3%). Occult inguinal hernia was noted and repaired in eleven patients (14.7%).

Conclusions  Sports hernia is a bilateral disease. The laparoscopic approach affords the opportunity to visualize both groins simultaneously. An added advantage is the ability to diagnose and correct a concomitant occult inguinal hernia.

Key Terms  Sports hernia, Athletic pubalgia, Groin pain, Adductor muscle

Introduction

Groin pain in athletes is a common source of frustration for all parties involved, including the athlete and the treating physician. Estimates suggest between 5-28% of all sports injuries occur in the groin. The etiologies include a wide array of musculoskeletal problems including myotendinous injuries of the hip and abdominal wall, spine and hip disorders, neurologic and genitourinary injuries. Sports hernia, also commonly referred to as sportsman’s hernia, Gilmore’s groin, and more recently, athletic pubalgia, is one type of groin injury that can be debilitating; leading to shortened athletic seasons and careers. Originally described as an injury most commonly seen in hockey and soccer players, it is now more often seen in all types of sports. Gilmore originally describe a number of distinct pathologies that later were lumped together as disorders of the inguinal wall. In 1992, Malycha and Lovell developed the term “sports hernia” to describe a bulge in the posterior inguinal wall that represents an incipient
inguinal hernia.\textsuperscript{19} Sports hernia is largely a clinical diagnosis, but recent advances in MRI and musculoskeletal ultrasound have help to aid in more accurate diagnosis.\textsuperscript{3,24,27,38,42}

Sports hernia is believed to develop because of a strength mismatch between the abdominal musculature and the adductors. This relative imbalance can lead to injuries of either the central abdominal wall muscles or the upper common insertion of the adductors.\textsuperscript{30} Swan suggested that shearing forces across the hemi-pelvis created by the strong pull of the adductors against the relatively under conditioned abdominal muscles may cause attenuation or frank tearing of the transversalis fascia and overlying musculature.\textsuperscript{11,37} Others have suggested that a reduction in hip joint rotation may induce greater shear forces across the pubic symphysis from the pull of the more powerful adductors.\textsuperscript{10} These theories lend support to the suggestion that sports hernia is caused more often by chronic repetitive injury to the abdominal wall, rather than acute trauma. Conservative measures such as rest, physical therapy, corticosteroids, NSAIDS, local analgesic injections, and platelet rich plasma injection have been reported\textsuperscript{12,13}, but most of literature supports surgical repair as the most effective.

In this article, the term sports hernia is defined as chronic, activity related groin pain which has been unresponsive to conservative therapy and is caused by variety of anatomic injuries to posterior inguinal wall, conjoint tendon abdominal musculature and adductor muscle origin complex. Controversy exists within the literature as to which type of surgical repair is the most successful, and whether or not a sports hernia contains a hernia at all. The crux of this argument is that a sports hernia is not a true hernia because it lacks a herniation or protrusion of a visceral sac.\textsuperscript{8,9} However, despite the lack of herniation and strict anatomic purity of the term, the sports hernia surgical repair is very similar to that of an inguinal hernia repair and the popularity of the term in the lay public and frequent usage in the medical literature seems to have cemented the term.

We propose that sports hernia is a bilateral disease, and therefore the laparoscopic approach affords the ability to address both sides simultaneously during the same surgical procedure. It also addresses the weakness in the pelvic floor without surgically disrupting the adductor muscle.

**Methods**

An IRB exemption for this study was obtained by Western Institutional Review Board on July 26, 2012. A modification of the publication title and the addition of an author prompted a confirmation of the exemption by the same agency on March 1, 2013. A total of seventy five patients underwent a laparoscopic total extraperitoneal approach (TEP) to sports hernia between June 22, 2007 and August 31, 2012. A retrospective chart review was performed. Charts were reviewed for age, type of sport, level of competition, preoperative physical
examination findings, imaging, incidence of bilaterality, presence of occult hernia or lipoma, complications, postoperative return to sport and exam findings.

Operative procedure

All operations were performed by a single surgeon under general endotracheal anesthesia. A laparoscopic total extraperitoneal approach was used in all cases. Cord structures were skeletonized and dissected in all patients to identify and correct any occult inguinal hernia or lipoma of the cord. Bilateral palpation and inspection was undertaken in all patients. The posterior floor, direct space, symphysis pubis, and the rectus insertion were inspected carefully. The posterior floor was reinforced with polypropylene mesh in most cases.

Results

Preoperative demographics and results

Of the seventy five patients 69 (92%) were male, and six (8%) were female. The average age of the patients was 28.3 years (range: 15-58 years). The average duration of pain was 13.3 months (range: 2-96 months).

The distribution of the type of sport is listed in Table 1.

Table 1
Distribution of sport

<table>
<thead>
<tr>
<th>Sport type</th>
<th>Number of Athletes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soccer</td>
<td>19</td>
<td>25.3</td>
</tr>
<tr>
<td>Football</td>
<td>11</td>
<td>14.7</td>
</tr>
<tr>
<td>Track and Field</td>
<td>11</td>
<td>14.7</td>
</tr>
<tr>
<td>Baseball</td>
<td>7</td>
<td>9.3</td>
</tr>
<tr>
<td>Basketball</td>
<td>4</td>
<td>5.3</td>
</tr>
<tr>
<td>Ultimate Frisbee</td>
<td>3</td>
<td>4.0</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>20</td>
<td>26.7</td>
</tr>
</tbody>
</table>

Miscellaneous = hockey, softball, tennis, martial arts, rugby, mountain climbing, equestrian, gymnastics, lacrosse, pickle ball, waterskiing

The level of athletic competition is listed in Table 2.

Table 2
Level of Competition | Number of Athletes | Percentage |
|---------------------|-------------------|------------|


Groin pain was unilateral in 42 athletes (56%) and bilateral in 33 (44%). The most frequent presenting complaint was deep lower abdominal pain or groin pain. 98.6% of the athletes had a classic description of activity related groin pain that worsened with lateral motion or “cutting” movements. 94.7% of the athletes had improvement of their symptoms with rest and had little or no symptoms with activities of daily living. 57.4% of the athletes had a period of rest and an attempt at physical therapy directed to the core and adductors. All of the athletes had patulous, loose superficial (external) rings. 91.5% had palpable tenderness and weakness in the medial inguinal floor. 45.6% had tenderness over the symphysis pubis.

A total of 43 patients (57.3%) had either preoperative MRI of some type or musculoskeletal ultrasound. The most consistent finding on MR was bony edema in the symphysis pubis. The most consistent finding on ultrasound was a convexity or bulging of the posterior floor with valsalva.

**Intraoperative results**

All of the athletes had findings of weakness or attenuation in their posterior floors. Bilateral attenuation of the posterior floor was noted in seventy four athletes (98.7%). Unilateral findings were demonstrated in just one patient (1.3%).

All of the patients with bilateral findings had mesh placed on both sides. The majority of the patients had polypropylene (Bard, 3D Maxx™, large) placed. The meshes were positioned such that they overlapped across the midpoint of the symphysis pubis. In the event of a large peritoneal rent that could not be repaired (in the setting of a previous operation), a composite mesh (Bard Composix™) was utilized. In the situation of a significant midline weakness, attenuation or absence of rectus muscle, a third reinforcing overlapping piece of mesh was used (Bard, 3D Maxx™, medium).

Occult inguinal hernia was noted and repaired in 11 patients (14.7%). Two patients (2.7%) had a lipoma of the cord which was reduced along with their peritoneal reflection.
Postoperative results

The operative procedure was performed on an outpatient basis in 72 patients (96%). 3 patients (4%) required admission; 2 patients were admitted for pain control and 1 patient was admitted with aspiration. 4 patients (5.3%) developed urinary retention managed as an outpatient with short term Foley catheterization. All resolved without incident. There was one bladder injury (1.3%) which was recognized intraoperatively. This was repaired primarily and a Foley catheter was left in place for ten days. A CT cystogram was done to confirm the resolution of the injury. One patient had persistent symptoms postoperatively and required an open adductor release 108 days post operatively. That patient also had MRI findings preoperatively that suggested adductor pathology that did not respond to physical therapy.

Patients were seen in follow up at ten days, one month, and three to six months. All patients were instructed to wear an athletic support (male only), apply ice for comfort, and restrict core activities for one month. Patients were cleared to resume athletic activity according to their level of comfort at one month postoperatively.

All of the athletes (100%) returned to sport with significant improvement or resolution of their groin pain. All of the repairs were noted in the final visit to be “solid”.

Discussion

Sports hernia is becoming a more recognized diagnosis. As such, more patients are seeking surgical solutions and the question as to acceptable options for repair, complications and failure rates continues to arise. There are reports of different techniques for sports hernia repair although very few have reported on their operative findings on the contralateral side.\textsuperscript{2, 36,40} This could not be addressed with the open repairs that were first described because of the unilateral nature of the repair.\textsuperscript{4,8,10,14,17,20,35,38} Our results clearly demonstrate that sports hernia is a bilateral disease. 98.7% of the athletes were noted to have bilateral posterior wall attenuation or weakness. The laparoscopic approach affords the opportunity to visualize both groins simultaneously. An added advantage is the ability to diagnose and correct a concomitant occult inguinal hernia. In our series, the incidence of occult hernia was 14.7%.

The literature to date has focused mainly on outcomes following the different surgical approaches. However, there is little to no consensus as to the prevalence of sports hernia pathology in the asymptomatic/contralateral side. This most likely is due to the overwhelming number of open repairs to the affected side in the earlier studies. However, despite more reports of successful laparoscopic sports hernia repair techniques, there is little comment on the presence or absence of contralateral findings. Those studies which include data on the
contralateral side show a trend towards bilateral disease. Azurin, Srinivasan, and van Veen all reported laparoscopic findings of bilateral disease in 88%, 66% and 24% respectively.  

Controversy still exists regarding the role of the adductor and whether or not it needs to be surgically addressed during a sports hernia repair. Earlier reports postulated that the adductors created an imbalance across the pubic symphysis that was successfully addressed surgically through an adductor tenotomy procedure. As more laparoscopic studies with high success rates have been published, the role of the adductor has become unclear. Successful treatment to the posterior floor through a laparoscopic total extraperitoneal approach is highly successful throughout the literature and within our study. This may be because the pain is due to an imbalance between the posterior wall, conjoint tendon and rectus abdominus muscles. Therefore, supporting the posterior wall eliminates the need to surgically manipulate the adductor tendon. In our study, only 1/75 (1.3%) patients needed to have a subsequent adductor procedure after initially undergoing TEP.

Our approach shifted slightly during the course of the study. Initially we utilized both MRI and ultrasound to gain an understanding on the role of the adductor. Unlike many of the documented reports, MRI in our case was often equivocal and failed to routinely reveal any adductor pathology (either tendonosis or tearing). Ultrasound revealed only posterior wall weakness with valsasva. In our study, most patients underwent initial physical therapy and rest, and proceeded to sports hernia repair upon failing conservative measures. As our experience grew, we relied less on the imaging and more on the physical exam, history and lack of response to physical therapy. We modified our rehab approach to be more aggressive regarding the adductors early in the process. Those patients who did not improve despite aggressive therapy and rest underwent laparoscopic (TEP) sports hernia repair. We recognize that perhaps this shift in rehabilitation created a bias, suggesting that the adductor need not be addressed surgically in most cases of sports hernia.

Our current approach to the athlete with sports related groin pain centers around the weakness in the pelvic floor. A thorough history of pain with activity that improves with rest provides credence to the consideration of sports hernia as a diagnosis. Our physical exam focuses on strength and reproduction of symptoms with resisted adduction at 0°, 30°, and 90° of hip flexion and pain with abdominal curl up or bilateral supine straight leg raise and hold at 30°. Pain and weakness with these or part of these maneuvers further supports sports hernia, as well as dilation of the external inguinal ring and weakness in the pelvic floor with valsalva. We believe a dedicated adductor strengthening and core strengthening program is essential, and in some with mild cases, this may eliminate the need all together for sports hernia repair. In those with persistent symptoms despite a dedicated rehabilitation program, laparoscopic (TEP) sports hernia repair is an excellent surgical choice. We feel, especially in the high level athlete,
that preserving the function of the adductor is essential to return to play and performance, and the laparoscopic approach allows for repair to the contralateral side at the same time which may prevent further surgery at a later date.

There are weaknesses to this publication. The review was a retrospective single surgeon case series. Early in the surgeon’s experience, there was a lack of sophistication in the anatomic description of the posterior floor findings. There was a lack of consistency in this use of imaging studies such as MRI, and musculoskeletal ultrasound. There has also been no routine standardized use of functional outcomes assessments. It is impossible to say how much of the surgical benefit was due to placebo as there was no randomization.

Conclusion

Groin pain is common in high level athletes. The diagnosis of sports hernia remains elusive for many providers; it is an area of much confusion and controversy. In our experience, sports hernia represents chronic, activity-related groin pain that does not respond to conservative measures. In this series, there is a high incidence of bilaterality at the time of surgery although many athletes were symptomatic only on one side. The laparoscopic total extraperitoneal (TEP) approach offers the advantage of inspection of the entire posterior floor and may be a superior treatment approach to open repair.

Acknowledgements

Peter T. Gaynor, Justin Heistand, M.D.

References


