A LETTER FROM

SYDNEY, AUSTRALIA

Sports hernia controversies and scepticism

– Written by John Garvey, Australia

Few issues in sports medicine are as poorly understood, poorly studied in a controlled way and as poorly managed as groin pain in the athlete. In March 2011, the American Hernia Society conducted a symposium and discussion forum on the management of sports hernia at the 14th Annual Hernia Repair Conference in San Francisco, chaired by Dr Robert J Fitzgibbons Jr M.D. (USA) and Dr Johannes Jeekel M.D. (The Netherlands). Many of the world's experts on the topic were assembled at the symposium.

Dr Guy R Voeller M.D. (Memphis, TN, USA) had the honour of leading the symposium with a paper titled *Sports hernia – the basics*. Voeller asserted that the pathology of sports hernia is not clearly defined. The symptoms of pain at the pubic tubercle have an insidious onset and seem to improve with rest. Voeller believes that two joints are involved: the hip joint and the pubic joint. He indicated that there are multiple problems, including a lack of guidelines for the establishment of treatment protocols, and he made a plea for well-designed trials. He advised attendees to be cautious about the information they chose to take back to their practices, because groin pain can end an athlete's career – often after much expense. Voeller said that the placebo effect can be strong and each operation has problems. He advised practitioners to watch the experts, to "go work with somebody and learn it well". He traced the history of footballers' groin injuries back to Cabot in 1966[1] who reported 202 cases in 42,000 Spanish soccer players during a 30-year period. Malycha and Lovell[2] introduced the concept of sports hernia as a bulge in the posterior inguinal canal floor, performing a two-layer repair in 50 athletes, followed by a questionnaire six months postoperatively. Thirty-three patients were "good" and 10 were "improved". Akermark[3] was the first to describe adductor tenotomy: of 16 patients, 15 returned to sport. Voeller referred to Bradshaw's work[4] on the hip joint and pubic symphysis. Voeller described acetabular labral tears diagnosed by magnetic resonance imaging (MRI) arthrogram as "common" and included osteitis pubis in the syndrome. His treatment recommendations included icing, steroids and local anaesthetic injection. Voeller also described Irshad's 2001 work[5] on peripheral nerve entrapment in the external oblique aponeurosis, and said that he believes the nerve can be blocked by test injection. If positive, groin exploration and nerve release can be performed. Voeller refers patients to his colleague William Meyers of Philapelphia[6] for reattachment of the rectus abdominis muscle and adductor tenotomy. Although Voeller receives a four-page report, he said he has never seen any convincing video or pictures of pathology at operation. He maintained that the operation can be open (Bassini, Shouldice) with 90 to 95% of patients returning to full activity and that laparoscopic transabdominal preperitoneal (TAPP) or totally extraperitoneal (TEP) also achieve good results.

Dr Salvadore Morales-Conde M.D. (Seville, Spain) thinks there is much confusion about the aetiology of sports hernia and believes the problem is caused by straining the abdominal muscles around the abdomen and lower extremity that insert onto the pubic bone. He believes a syndrome of muscle imbalance of the groin creates a weakness (sports hernia) or degeneration arthropathy; these muscles of different shape allow for weak areas in the groin. However, there is no clear pathology in up to 60% of patients. Morales-Conde believes forces in the mid-zone of the pubic bone and muscles of the leg exert opposite forces and create an imbalance between the muscles of the leg and the muscles of the abdomen, causing muscle or tendon disruption and weakness in other areas of the groin. He has classified groin disruption injury as:

Type 1) pubic bone stress treated by rest or anti-inflammatory medication and

Type 2) sports hernia treated by laparoscopic TEP repair to reinforce the posterior inguinal canal wall.

The treatment for Type 1 is rest, anti-inflammatory medication and muscle retraining. The treatment for Type 2 is surgery. He prefers either glue fixation of lightweight laparoscopically placed mesh or no fixation and believes that the laparoscopic approach reinforces a weakened area.

Dr Giampiero Campanelli M.D. (Milan, Italy) believes the condition is not a hernia and that it should instead be called "obscure groin pain". The syndrome is defined from clinical manifestations and certain features found operatively, including hypertrophic muscles pulling on tendons of the pubic bone and muscles pushing against each other, causing compression of the peripheral nerves. He always finds a bulge in the external oblique aponeurosis with iliohypogastric nerve compression. He finds that pubic pain when performing sit-ups is diagnostic and can compress the whole spermatic cord. He diagnoses with ultrasound, computed tomography (CT), MRI and herniogram (if necessary). He prefers to use conservative treatment for about one and a half months, after which time the pain usually disappears. However, if surgery is required, Campanelli prefers an open approach to allow release of the peripheral nerve. He believes the operative findings are always the same – bulge, hypertrophic muscle and nerve compression – and that the aim of surgery is to reduce the bulge and release the iliohypogastric nerve. He prefers the open approach with lightweight mesh or biological mesh fixed with fibrin

glue and believes that because the muscles are strong, rather than weak, a strong repair is not needed. Campanelli indicated that sports hernia will be a major topic for the World Hernia Congress in Milan in 2015.

Dr Andreas Koch M.D. (Cottbus, Germany) believes that the incidence of sports hernia in high-performance athletes is between 0.5 and 6.7% and that sports hernia comprises 5 to 7% of all sports injuries. Koch believes that the injuries of osteitis pubis and tendonosis can be considered as aspects of sports hernia syndrome. He prefers a program of three to six months of conservative treatment. If the treatment program relieves the pain, no operation is performed. He finds a bulge in the fascia transversalis, which is sutured, and he favours the anterior pelvic floor repair of Dr William Meyers of Philadelphia, USA. Meyers has put forward the notion of dynamic pubic complex. Koch was consulted by more than 300 patients between 2006 and 2010; of these 13% underwent surgery and 97% returned to full training and playing eight to 12 weeks postoperatively. Koch considers denervation to be insufficient and considers Meyers' anterior pelvic floor repair to be the most effective when assessed two to three months postoperatively. Koch prefers not to use mesh.

Dr David Lloyd M.D. (Liecester, UK) takes a completely different approach. He likened the tension of the inguinal ligament on the pubic bone to tennis elbow. He performs a laparoscopic inguinal release procedure. Symptoms include groin pain from the inguinal ligament when sneezing, coughing or alighting from a car. He does not like the term 'sports hernia' but considers the tension on the inguinal ligament to be a true entity. The pain is located at the deep inguinal ring and around the pubic tubercle or within a few centimetres of the pubic tubercle. He finds swelling of the inguinal ligament and pubic tubercle, conjoint tendon, pectineal ligament and an oedematous lacunar ligament and believes that the pain can be released by a three port repair (TAPP). At operation, Lloyd finds holes in the lacunar ligament, fat – which he pulls out (de Laugier hernia) – and scar tissue. He finds

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osseous change in the inguinal ligament that is rather like bone. Lloyd referred to Hasselbach's ligament, attenuation of the lacunar ligament and 'holes' above and below the inguinal ligament. The inguinal ligament and a shrivelled lacunar ligament cause pain in the pubic bone. The fascia looks abnormal and is the site of pain. He finds underneath that the inguinal ligament is torn and attenuated, and he strips the iliopubic tract and pectineus and releases the ligament. The lateral edge of the rectus abdominis muscle sheath is cleared off the pubic tubercle. He removes all sutures and all attachments from the pubic tubercle, examines the pectineal fascia and performs a limited tenotomy of the pectineal fascia analogous to an adductor tenotomy. He has proposed that the syndrome is a compartment syndrome of the pectineus muscle due to bulging; he performs a tenotomy of the myopectineal fascia and divides the pectineal ligament. He has operated on 73 athletes with an 92% success rate.

Dr John FW Garvey M.B. (Sydney, Australia) favours the term "groin disruption injury" and believes that the spectrum of pathologies of sports hernia, conjoint tendon tear, adductor tendonopathy, osteitis pubis, acetabular labral tear of the hip joint and peripheral neuralgia all comprise one specific pattern of injury. He favours diagnosis of sports hernia by an experienced sonologist, demonstrating a protrusion in the medial aspect of the posterior wall of the inguinal canal and performs a 'groin reconstruction' operation after a period of three to six months of failed conservative treatment. This is followed by a three-month graduated physiotherapy program. He believes the demographic of young males with preoperative pain and an impalpable hernia is the same as that for postherniorrhaphy groin pain syndrome and that many patients who have chronic groin pain after hernia repair surgery have "missed" groin disruption injuries.

Dr L Michael Brunt M.D. (St Louis, MO), although not on the panel, spoke in the Invited Expert Video Session on the treatment of sports hernia and indicated that the time between onset of symptoms and presentation is, on average, nine months in patients who have tried everything else. He believes that there is real structural pathology but that the operation differs from a hernia repair. He stressed the selection of the athlete and the differential diagnosis, which included osteitis pubis, femoro-acetabular impingement, labral tear of the hip joint and adductor pathology. The presenting symptom was inguinal or lower abdominal pain during the extremes of exertion. If the pain is present 24 hours a day or while sitting (e.g. in a car), it is not a case of sports hernia. However, if the pain occurs when performing sit-ups or trunk rotation, it is likely to be a sports hernia. He indicated three mechanisms: rectus/adductor complex white line, defect in the posterior wall (preperitoneal direct hernia) or nerve irritation (ilioinguinal or genitofemoral) through a window in the external oblique muscle. Brunt's video demonstrated thinness in the external oblique medially and distally but no true hernia bulge. He said he rarely finds an indirect sac but preserves the genitofemoral nerve. He uses a lightweight polypropylene mesh and splints the mesh around the spermatic cord, suturing it to the inguinal ligament. He will resect the ilioinguinal nerve if there is the possibility it could become tethered by the mesh. Brunt considers the aetiology of pain to be stress across the pubis, which is unbalanced. Brunt indicated that he started adding adductor tenotomy 18 months prior because he had failures without adductor tenotomy. He believes this releases the pressure across the pubic bone and increases blood supply.

PANEL AND AUDIENCE DISCUSSION

A vigorous discussion followed, which was led by Dr Guy Voeller who said that all of the treatment methods described by the speakers are different approaches to the one problem and that in his opinion none of the operations are ideal. He said he does not feel comfortable with any operation and does not perform an operation himself but instead refers patients to Dr Meyers in Philadelphia. He advised surgeons to "pick the operation you believe in". Campanelli indicated that there is the same number of treatment options for sports hernia as there is for hernia surgery and that although there is confusion about pathology, everything will work, which indicated to Voeller that there must be a placebo effect. Voeller argued that follow-up must be longer than six months, but with some of the studies, the time span was not long. Morales-Conde wondered whether all the practitioners were operating on the same patients and whether MRI should be required for identification of pathology. Lloyd argued that the laparoscopic and open operations were not successful; therefore, it could not be nerve pain but must instead be due to chronic tendonitis resulting in inflammation around the pubic bone where the inguinal ligament attaches.

Regarding nerve pain, Campanelli wondered why steroid injections were not used; Jeekel argued that injections could cause inflammation, and Lloyd said he was not in favour of injections. Chairman-elect of the American Hernia Society Dr B Todd Heniford said that he operates on a small percentage of clients. He refers all his patients back to his sports medicine colleague and prefers a multidisciplinary approach involving sports medicine, trainers and physiotherapists.

The panel was asked if there were any two findings for sports hernia on which they could concur. Voeller indicated that he has trouble seeing the pathology and regards sports hernia as a normal variant, adding "fat is God's cork, it is not pathology". Morales-Conde indicated that the deficiency of the posterior inguinal canal wall was the consistent finding, whereas Campanelli argued that the strength of pull of the rectus muscle on the pubis created the deficiency. Andreas Koch maintained that the pull of the rectus muscle on the pubic bone created the bulge in the fascia transversalis. Garvey said that in a symptomatic patient, pain in the conjoint tendon on resisted sit-up and sonographic finding of incipient hernia is an indication for reconstructive surgery. Questioners from the audience were still confused and called for a neurophysiological analysis of pain, splinting of the area of injury allowing healing and a sham operation control. One questioner likened the controversy to the biliary dyskinesia debate where the gall bladder was normal but was still removed, resulting in a favourable outcome.

Dr Dwijen Misra M.D. from the audience presented the following scenario to the panel: a 17-year-old athlete playing hockey for Harvard or Yale University who developed groin pain during summer camp and underwent evaluation by sports medicine physicians, physiotherapists, MRI and bone scan. Clinical and imaging evaluations were normal; however, he has to play for a scholarship in six weeks. Students in this situation have only one chance to play for their scholarship opportunity. The panel's advice ranged from six months of physiotherapy (foregoing the opportunity for a scholarship) to inguinal ligament release, anterior repair with lightweight mesh and laparoscopic TEP repair. Chairman Dr Robert Fitzgibbons said that if our treatment choice is correct with this type of patient, we have an extremely grateful patient and parents and described this scholarship situation as unique to the USA: "There is one shot to get this player fixed."

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CONCLUSION

Clearly a randomised controlled clinical trial is required to determine whether this injury responds better to active physiotherapy or to surgery and which type of surgery is more successful: open (tension free tissue repair, Shouldice, Lichtenstein, or minimal) or TEP. Dr Guy Voeller's call for a well-designed trial has been heeded: a randomised control trial is in the planning stages in Denmark (P. Holmich, personal communication).

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