FROM HERNIA TO SPORTS HERNIA

Eugene Kots
Meir Medical Center
Kfar Sava
HERNIA IS A PROTRUSION OF A PART OR STRUCTURE THROUGH THE TISSUES NORMALLY CONTAINING IT
Sonography of Inguinal Region Hernias
David A. Jamadar et al., AJR 2006
University of Michigan
HERNIAS

- Spigelian hernia
- Indirect hernia
- Direct hernia
- Femoral hernia
INDIRECT HERNIA
DIRECT HERNIA
US allows an accurate orientation in abdominal wall anatomy

Based on the understanding of the static anatomic picture, dynamic US allows diagnosis of the abdominal wall hernias

Do we really need it?!

Is it clinically justified??!!
Inguinofemoral Hernia: Accuracy of Sonography in Patients with Indeterminate Clinical Features

Philip Robinson et al., AJR 2006
Leeds Teaching Hospital
MATERIAL AND METHODS

- 59 pts (m=47; f=12) – 64 sides
- History suggestive for hernia > 3 months
- Normal (n=52) or equivocal (n=12) clinical features
- All patients underwent sonography and herniography
- 18 pts were operated on 21 sides
RESULTS

- 18 pts were operated on 21 sides: hernia (n=20) and patulous posterior inguinal wall (n=1)

- Six of these hernias were on the original asymptomatic side!
RESULTS - SONOGRAPHY

- Correct detection of hernias in 19 of 20 sides
- Correct detection of patulous PIW in one case
- Sensitivity – 95%
- Specificity – 100%
- PPV – 100%
DISCUSSION

- High sensitivity and specificity of the sonographic study
- Sonography is more accurate than herniography, especially in fat-filled hernias
- Sonography should be first-line imaging investigation in pts with equivocal findings
Radiologists can accurately diagnose small abdominal wall hernias using dynamic US.

Dynamic sonography is very sensitive and 100% specific compare to surgical examination.
The sports hernia is one of the least understood poorly defined and under-researched maladies to affect the human body.

…reflects a compilation of diagnoses grouped together with a wide range of other pathologies that needs to be excluded before this should be considered as a diagnosis.

P Caudill 2008
SPORTS HERNIA

- Definition is unclear;
- Diagnosis is challenging;
- Management is problematic
SPORTS HERNIA

- The Athletic Hernia: A Systematic Review
  Kenneth G. Swan Jr. and Michelle Wolcott,
  Clinical Orthopaedics and Related Research, 455:78-87, 2006

- Sports Hernia: a systematic literature review
SPORTS HERNIA

- Imaging Review of Groin Pain in Elite Athletes: An Anatomic Approach to Imaging Findings
  G Koulouris, AJR, 191:962-72, 2008

- Review: imaging of groin pain in the athlete
  Davies AG et al., Skeletal Radiol, 2009 epub.
Magnetic Resonance Imaging of Athletic Pubalgia and the Sports Hernia
Current Understanding and Practice
Khan W, Zoga AC, Meyers WC
SPORTS HERNIA

- Athletic pubalgia
- Gilmore’s groin
- Hockey groin syndrome
- Incipient hernia
- Posterior inguinal wall insufficiency
- Conjoint tendon injury
- Core injury
SPORTS HERNIA: ETIOLOGY

- Unclear;
- Kicking sports;
- Rapid change-of-direction while running;
SPORTS HERNIA: ETIOLOGY

- The strong pull of the adductors against a fixed leg;
- Imbalance between adductors and lower abdominal musculature;
- Shearing force across hemipelvis;
- Weakening or tearing of the transversalis fascia or internal oblique aponeurosis.
SPORTS HERNIA: PATHOPHYSIOLOGY

- Probably more controversial than etiology;
- Weakening or deficiency in the posterior inguinal canal;
- Preperitoneal lipoma;
- External oblique aponeurosis tearing;
- Conjoined tendon tearing;
- Rectus abdominis muscle/aponeurosis tearing;
- More than one lesion?!!!
CLINICAL DIAGNOSIS

- Dull and diffuse pain about the groin;
-Usu no acute event;
- Chronic in nature;
- Resistant to conservative treatment
PHYSICAL EXAMINATION

- No detectable inguinal hernia
- Inguinal canal tenderness
- Dilated superficial inguinal ring
- Pubic tubercle tenderness
- Hip adductor origin tenderness
DIFFERENTIAL DIAGNOSIS: ORTHOPAEDIC ETIOLOGIES

- Muscle / aponeurosis problems;
- Bone / joint problems;
- Nerve problems;
- Reumatologic problems.
DIFFERENTIAL DIAGNOSIS: NONORTHOPAEDIC ETIOLOGIES

- Surgical (hernia, GI neoplasms, diverticulitis);
- Urologic;
- Gynecologic.
IMAGING

- X-Rays;
- Bone scan;
- CT;
- Herniography;
- MRI;
- Ultrasound
ATHLETIC PUBALGY: CONTINUUM OF INJURIES

- Pubic Stress Syndrome:
  - osteitis pubis
  - myotendinous junction (aponeurotic) injuries
- Inguinal wall insufficiency (Sports Hernia)
  - posterior wall insufficiency
  - anterior wall insufficiency
- True hernia

G. Koulouris, 2008
X-Rays: Osteitis Pubis
Osteitis Pubis
Osteitis Pubis
Osteitis Pubis and Aponeurotic Injury
MRI PATTERNS

- Bone marrow edema around the symphysis;
- Secondary cleft sign;
- Edema along the lateral edge of the rectus abdominis attachment;
- Mostly midline changes

Aponeurotic Injury

Secondary cleft sign
Aponeurotic Injury
Aponeurotic Injury
Aponeurotic Injury
APONEUROSIS INJURY
ADDUCTOR STRAIN / TEAR
ADDUCTOR LONGUS TEAR
Sports Hernia - Ultrasound

- Diagnostic imaging to identify sports hernias has not been particularly useful, with the exception of ultrasonography, which enables a dynamic assessment

P Caudill 2008
Ultrasound

- Dedicated to soft tissues
- High spatial resolution
- No radiation exposure
- Time- effectiveness
- Low cost
- Convenient for patients
Ultrasound (cont).

- Dynamic imaging
- Sonographic palpation
- Real–time guiding for interventional procedures
Sports Hernia: Simplistic Conception

- Acquired inguinal wall deficiency not of sufficient severity to result in discrete hernia formation

- Overuse phenomenon

- Occurring in approximately 15% of athletes with groin pain

G. Koulouris
Sports Hernia: Simplistic Conception

- Anterior inguinal wall deficiency
- Posterior inguinal wall deficiency
- Both

G Koulouris
Anterior Wall deficiency

- “Gilmore groin”
- Degeneration and partial tearing of external oblique aponeurosis
- Dilatation of superficial inguinal ring
- Clinical diagnosis only??! Sonographic palpation?!!
Posterior Wall Deficiency

- Ballooning of the inguinal canal during strain
- Fat protrusion between Inferior Epigastric Vessels and lateral border of Rectus Abdominis during Valsalva manoeure
Connell DA et al., Sonography and MRI of rectus abdominis muscle strain in elite tennis players, AJR 2006; 187:1457-61


Goh LA et al., Ultrasonographic features of an adductor longus tear: case report, Can Assoc Radiol J 2001; 52:252-4
DYNAMIC US – BALLOONING OF PIW

- Dynamic US of inguinal canal
- Good correlation between groin pain and posterior wall deficiency
DYNAMIC ULTRASOUND

- Ballooning of the inguinal canal during strain
- Anterior bulge of the posterior inguinal wall during strain
DYNAMIC US – BALLOONING OF PIW
DYNAMIC US – BALLOONING OF PIW

STRAIN
DYNAMIC US – BALLOONING OF PIW
ANTERIOR BULGING
ANTERIOR BULGING
SPORTS HERNIA

- Dynamic sonography!!!
- Functional MRI?!
US: pros and cons

- Better demonstration of muscle architecture
- Less time consuming
- More useful in assessing the stage of healing
- The probe could be placed exactly where it hurts (sonographic palpation)
- Guiding of therapeutic procedures
- Dynamic assessment
- Limited assessment of bone pathology and deep tissues
US: pros and cons

- Operator dependent
- Long learning curve
MRI: pros and cons

- One-stop shopping
- Bone and soft-tissue pathology
- Depicts definitive patterns of findings in Pubic Stress Syndrome
- Hip joint could be included
- Static investigation
- No dynamic information
Stress Fracture
Take Home Points

- Pubic Stress Syndrome:
  - could be assessed by US
  - other imaging modalities like X-ray, CT and bone scan could be helpful
  - MRI is an imaging method of choice
**Take Home Points**

- **Sports hernia:**
  - is best assessed by dynamic sonography
  - could be a clinical diagnosis and a radiological diagnosis of exclusion

G Koulouris