Ultrasound Guided High Volume Injections

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Introduction

- Lots of variation
- Frozen shoulder, Achilles, patellar tendon, subacromial bursa, MCL, greater trochanteric pain syndrome
- Volumes – 10-50 ml
- Different injectates
  - Water, saline, steroid, hyaluronic acid
- Repeat injections
- Difficult to do research with controls
  - Lots of variation in study methods (case studies)
  - Short term follow up in studies – need long term FU
Frozen Shoulder (Capsulitis)

- Cause poorly understood
- Inflammatory +/- fibrotic (Dupuytren’s)
- Limited external rotation
- **4 stages**
  - 1 – 0-3/12 synovitis (steroids?)
  - 2 – 3-9/12 “freezing” beginning of scar formation
  - 3 – 9-15/12 “frozen” scar formation and capsular thickening (no synovitis), ↓pain, ↑stiffness
  - 4 – 15-24/12 “thawing” further ↓pain & ↑ROM
- Although “self-limiting” can last for years without treatment (2-4 years, up to 7)
Capsulitis – rotator interval
Capsulitis - Treatment

- Most improvement seen in first 3/12 with mobilisation
- Suprascapular nerve injection (pain relief)
- Steroids, hyaluronic acid
- Steroids best in early synovitic phase – multiple injections may be needed (2-3)
- May be a short term effect
- Hydrodilatation (stages 2>3) – dilatation rather than rupture? (either via MUA, arthroscopic or injection)
- Surgical risks – fracture, brachial plexus, axillary N.
Hydrodilatation – technique & efficacy

- Fluoroscopy or ultrasound
- First described in 1965 in Scandinavia
- Injectate – air, normal saline, water for injection, steroid, hyaluronic acid, lidocaine, marcain
- Volumes 10-40 ml (usually) - 50-100 ml
- Rupture usually occurs at 10-55 ml
- Probably don’t need to rupture, as ruptures in area of weakness (some do, some don’t)
- Follow up studies – 1-4 months (most 1-2 months only)
- Expect 80-90% reduced pain and 60-80% improvement in SPADI (shoulder pain and disability index) score
Side effects

• Pain is uncommon
• Flushing
• Numbness
• Infection (very rare)
• Allergic reaction
• Hyaluronic acid can cause pain in s/c tissues
• See steroids next
Steroid Side Effects

- Hyperglycaemia – can last for 2-5 days
- Hypertension
- Hot flushes & PM bleeding
- Facial flushing (10-15%)
- Joint flare (2-25%)
- Fat atrophy – white skin & loss of fat
- Adrenal suppression – lasts up to 2 weeks (HIV & Hep C anti-viral drugs)
- Epilepsy
- Zyban (anti-smoking)
- Cow’s milk allergy – methyl prednisolone (Solu Medrone)
Achilles

- Lifetime risk of 50% in elite distance runners
- 28 patients – chronic tendinosis failed conservative rx
- Questionnaire VISA-A score
- 25 mg hydrocortisone, 10 ml 0.5% Marcain, up to 40 ml NS, into Kager’s fat pad
- Rehabilitation programme (21 complied)
- 19 returned to sport, 10 at pre-injury level
- 60-70% reduction in pain and improvement in function at 4 weeks and at 7-8 months
Achilles 2

- Rationale – reduce neovascularity and damage nerve supply in Kager’s fat pad, soft tissue release (plantaris)
- 20-30 ml (4 ruptures with 40 ml & compartment syn)
- Add in sclerosant or hyaluronic acid?
- Plantaris tendon – if thickened inject fluid in gap (intersection syndrome)
- Rehabilitation programme
- Surgery better results with removing the plantaris tendon than removing calcification/tendinopathy
- Plantaris is stiffer and stronger and can compress the Achilles tendon
Patellar Tendon

- 22% of elite jumping sports over a career
- Difficult to treat
- 12 patients – all failed conservative rx so far
- Questionnaire VISA-P score
- 25 mg hydrocortisone, 10 ml 0.5% Marcain, 30 ml of normal saline into Hoffa’s fat pad
- Rehabilitation programme
- FU at 12 weeks
- Score improved from 45 to 65 (approximately)
- 1/3 returned to sport at 12 weeks
- Some patients – no long term benefit at 9 months
Knee MCL

- MCL can be at ½ strength for up to 2 years post injury, with prolonged pain and instability
- 28 patients – 19 responded
- IKDC – subjective knee form (VAS)
- 2 ml of 50 mg hydrocortisone and 10 ml of 0.5% Marcain injected deep to MCL
- Rehabilitation programme
- FU at 9 months on average (2 to 27 months)
- 2/3 (10) returned to previous level of sport
Greater Trochanteric Pain Syndrome

• Steroid is thought to be less effective than home training or shock wave therapy
• 8 patients – 6 responded
• 50 mg hydrocortisone & 10 ml 0.5% Marcain, injected “just deep to the periosteum”
• Rehabilitation programme
• FU at 1-2 months (mean 43 days)
• Pain & Function scores (VAS & HAGOS)
• Pain reduced 50% and QOL improved
Subacromial Bursa

• Italy and London
• Rationale – release adhesions/scar tissue
• Volumes up to 50 ml used
• I’ve used up to 20 ml
• Limited studies and information
• Some short term benefit shown in impingement syndromes from London Group
Summary

• High volume – use up to 50 ml
  – Shoulder hydrodilatation up to 50 ml (usually 20-40 ml)
  – Achilles up to 30 ml (usually 15-20 ml)
  – Patellar tendon up to 40 ml (more space)
  – MCL and GT 10 ml
  – Subacromial bursa up to 50 ml (aim for 20-30 ml?)
• Preferably don’t use steroid (tendon risk & long term?)
• Hyaluronic acid?
• Needs to be with rehab programme +/- shockwave therapy
• Limited evidence (like a lot of MSK)
• Low risk if you don’t use too much fluid and no steroid


• Baltsezak S. Management of adhesive capsulitis with landmark guided high volume steroid injections in the community based musculoskeletal clinic. Ann Rheum Dis, 2016, 72: Suppl2 SAT0511


• Ongoing research at Queen Mary University of London (Tendon research)
Questions?

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