The Management of Ganglia of the wrist and hand

David Chapple
“The treatment of ganglion has been marked more by ingenuity than success.”

Jordan 1893
The Management of Ganglia

- Arouse more interest than their clinical importance warrants
- rarely cause complications
- easily accessible to treatment
The Management of Ganglia

- GPs
- rheumatologists
- General surgeons
- Orthopaedic surgeons
- Plastic surgeons
- All attempt treatment
RECURRENCE RATE IS HIGH
The Management of Ganglia of the wrist and hand

- Ganglia statistics
- special types
  - interosseous
  - extensor sheath
  - nerve compression
  - ultrasound
  - ganglia in children
- flexor sheath ganglia
- mucous cysts
- anterior wrist ganglia

- treatment options
  - natural history
  - direct pressure
  - aspiration
    - with or without injection
  - surgical
Ganglia

- Wrist
  - dorsal (70%)
  - anterior (20%)
- Hand
  - flexor sheath (6%)
  - extensor sheath
  - Mucous cyst of the finger (4%)
Ganglia

- Smooth walled
  - tense
    - bony
      - esp. tendon ganglia

- fibrous capsule,
  - compressed collagen fibres

- lining?
  - epithelial
Ganglia

- fibroblasts and multifunctional mesenchymal cells
- Contents “mucoid flesh” Hippocrates
- Viscous clear mucous
  - glucosamine
  - albumin
  - globulin
  - hyaluronic acid
Ganglia

- Thin walled cysts
- develop in relation to
  - joint capsule
  - tendon sheath
- simple or multiloculated

PEDICLE
PEDICLE

- Dorsal
  - scapholunate vast majority
    - capitiate
    - radioscapoid joint
- Volar
  - radiocarpal
  - scaphotrapezimal
- Flexor sheath
- Mucous cysts
  - DIPj
Ganglion connections

• Andren and Eiken
  – showed injection into the joint passed through a “tortuous narrowed duct”
• injection into the ganglia failed to show the connection
  • valve mechanism

• Pre Op arthrography
  – role in identification of connection
  – use of methylene blue in identification of the stalk
High-resolution ultrasonography of wrist ganglia.
De Flaviis L, Nessi R, Del Bo P, Calori G, Balconi G

• The presence of a liquid-filled duct directed to the articular space was demonstrated in 8/11 cases (73%).
  • very useful for correct surgical planning
aetiology

• Unproven
• many theories
  – Trauma
  – local degeneration
  – retention cysts
  – herniation of synovia
  – bursal formation
  – mucinous degeneration of fibrous tissue
presentation

- Swelling
- impairment of function
  - directly
  - indirectly
- pain
  - flexor tendon ganglia
  - scaphotrapezial
  - otherwise rare
presentation

• Age range
  – Range 1mth onwards
  – 80% between 20 and 50
• gender
  – Ratio female to male, between 2:1 and 3:1
• WHY?
  • even flexor sheath ganglia 2:1
• 25/100,000 males and 43/100,000 females per year
presentation

- Size at presentation
- 90% less than 2cm
- many have small daughter cysts
Diagnostic Ultrasound

- A spherical fluid-filled structure with a well-defined wall
  - pigmented villonodular synovitis or tenosynovitis
Ultrasonography for the diagnosis of soft tissue conditions in the hand.
Hoglund M, Tordai P, Engkvist O

- Ultrasonographic diagnosis of the hand has proved it to be a valuable method for diagnosis of ganglions
  - Tendon ruptures, synovitis, tumours, and the presence of foreign bodies
types of ganglia

- Interosseous
- Extensor sheath
- Mucous cysts
- Flexor sheath ganglia
- Ganglia in children
- Anterior wrist ganglia
Interosseous Ganglia

- painful wrist
- commonest bones in hand
  - lunate
  - scaphoid
- differential
  - OA cyst
  - post-traumatic cyst
  - simple bone cyst
  - Osteiod osteoma
  - osteoblastoma
Interosseous Ganglia

- Female > male
- Present with pain
  - Dorsally, perilunate
- Restrict activities
- X-ray
  - Eccentric lesion
  - Thin sclerotic margin
- Bone scan
Interosseous Ganglia

- Treatment
- Dorsal oblique incision centred over the lunate
- dorsal drill holes
- extract gelatinous ganglion fluid
- pack with cancellous bone
Ganglia causing nerve lesions

Isolated compression of the motor branch of the ulnar nerve.

Isolated sensory impairment of the thumb due to an intraneural ganglion cyst in the median nerve

Ganglion cysts and carpal tunnel syndrome

Compression of posterior interosseous nerve by a ganglion

Compression of the palmar cutaneous nerve by ganglions of the wrist

Irritative neuritis of the dorsal sensory branch of the ulnar nerve from underlying ganglion

Compression of the radial nerve caused by an occult ganglion
Ganglia causing nerve lesions

- Anywhere along course of nerves
- Occult ganglia
- Tinel sign on tapping ganglion
Ultrasonography and Occult ganglia

- Very small ganglia can be difficult to palpate
- reported to more frequently cause pain
- wrist pain
  - Keinbock’s, carpal instability, TFCC, infection, arthritis
The natural history of ganglia in children.

Rosson JW, Walker G

The natural history of ganglia in children.

Rosson JW, Walker G


- 63 patients
  - 16 had operation
  - 29 found for review of 47
- Expectant policy
  - asymptomatic
  - transillumination
- 22/29 resolved spontaneously
- 20 of 22 resolved within 2 years

- MacCollum 1977
  - 9/14 with spontaneous resolution
- Confirm diagnosis
- manage expectantly
Ganglia in Children

• Active treatment of ganglia in children
  – MacKinnon and Azmy, Glasgow
    » Postgraduate medical journal 1977
• 128 children, 74 wrist and hand ganglia
• persistent or symptomatic ganglia
• 1.6:1 female to male for upper limb but equal for other sites
Active treatment of ganglia in children
MacKinnon and Azmy, Glasgow

• Several methods of treatment
  • excision under GA
  • transfixion with seton suture
  • aspiration and injection
  • incision with tenotomy knife
  • rupture by pressure
### Active treatment of ganglia in children

MacKinnon and Azmy, Glasgow 1997

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Wrist Count (Recurrent)</th>
<th>Others Count (Recurrent)</th>
<th>Rx Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excision</td>
<td>32(4)</td>
<td>37(1)</td>
<td>8(0)</td>
</tr>
<tr>
<td>Seton</td>
<td>22(8)</td>
<td>6(0)</td>
<td>7(3)</td>
</tr>
<tr>
<td>Asp/inj</td>
<td>11(7)</td>
<td>1(1)</td>
<td>4(4)</td>
</tr>
<tr>
<td>Tentomy</td>
<td>4(1)</td>
<td>5(0)</td>
<td>0</td>
</tr>
</tbody>
</table>
Active treatment of ganglia in children
MacKinnon and Azmy, Glasgow

• complications
  • 8 infection
  • 4 poor scar

• Conclusion
  – expectant policy
  – tenotomy knife
  – surgery reserved for persistent and symptomatic
Extensor sheath cysts

- Attached to tendon synovia
- change shape with finger movement
  - distally and flattens on flexion
  - proximally and more prominent on extension
Ganglia of the flexor tendon sheaths in the hand
Matthews, Cardiff

- Simple ganglia
  - sesamoid ganglia
  - pearl-seed ganglia
- 2:1 ratio
  - West Lothian 1:3
- Both hands equally affected
Ganglia of the flexor tendon sheaths in the hand
Matthews, Cardiff

<table>
<thead>
<tr>
<th>Digit</th>
<th>Right hand</th>
<th>Left hand</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thumb</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Index</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Long</td>
<td>14</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>Ring</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Little</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Ganglia of the flexor tendon sheaths in the hand
Matthews, Cardiff

- Site of origin
  - two distinct levels
  - middle of proximal phalanx at the level of the proximal skin crease
  - level of MCP joint
    - all FPL ganglia
Ganglia of the flexor tendon sheaths in the hand
Matthews, Cardiff

• Presentation
  – c/o tender nodule at the base of the finger
  – interferes with activities
  – earlier presentation 9mths (cf 2yrs)

• smooth dome shaped and tender to palpation

• does not move with tendon
Ganglia of the flexor tendon sheaths in the hand
Matthews, Cardiff

• Role of injury and occupation
  – 1746 Eller suggested localised rupture
  – several series for and against
  – repeated minor trauma

• Typists
  – 11/40, middle of proximal phalanx long finger
Ganglia of the flexor tendon sheaths in the hand

Matthews, Cardiff

- Treatment
- NOT direct pressure
- Aspiration
  - LA
    - 40% recurrence
- Surgical excision
  - longitudinal or transverse
  - excise disc of tendon sheath
  - 95% cure
Mucous Cysts of the Fingers

- Other names
  - synovial cyst
  - recurring myxomatous cutaneous cyst of the finger
  - myxomatous degeneration cyst
  - mucoid cyst
Mucous Cysts of the Fingers

- **Aetiology**
  - arise from joint capsule of DIPj
  - pedicle present
  - history of injury (35%-75%)
  - older age group
  - women>men

- **OA DIPj(93%)**
Mucous Cysts of the Fingers

- Small, firm, cystic mass
- Distal to DIPj (IPj)
- One side of mid line
- Skin, thinned
- Nail changes
  - Precede the cyst
Mucous Cysts of the Fingers

- Treatments
  - I&D
  - excision
  - irradiation
  - electrocautery
  - chemical cautery
  - cryotherapy
  - injection
  - amputation
  - radical excision with skin cover and osteophytectomy
Mucous Cysts of the Fingers

- Aspiration and direct pressure
- Compression dressing
- Two weeks
- Not treating the cause
Treatment

- incision drawn
  - excision of portion of skin over the ganglion
- meticulous dissection
- pedicle traced to joint capsule
- inspect joint
  - synovectomy, osteophytectomy
- rotation of skin flap
  - skin graft
- immobilize DIP 3/52
Complications following Mucous Cyst excision

Fritz et al, Cincinnati J Hand Surg 1997 22B: 2 :222-5

- Loss of ROM
  - 5-20 degrees extension
- infection
  - DIP(fusion)
- new nail deformity
- recurrence
- deviation
- persistent pain and swelling
Anterior wrist ganglia

• Mostly included in reviews of treatment of ganglia along with dorsal ganglia (70%)
• Few reports looking specifically at anterior wrist ganglia (20%)
• Contribute to high recurrence rate
Anterior wrist ganglia

- Higher recurrence rates of 30%
- Variable origin
- Two groups
  - 65% from radioscaphoid/scapholunate joint
  - 35% from scaphotrapezial joint
Anterior wrist ganglia

- Scaphotrapezial ganglion
  - FCR tunnel and opponens pollicis
  - scaphoid tubercle
- or
  - through scaphotrapezial ligament
  - into FCR tunnel
  - emerge proximally opening of tunnel
  - or distally into palm
Scaphotrapezial ganglion

- Diagnosis
- ganglion anterior to the scaphoid tubercle
- Fixed
- Often small (0.5 cm)
- painful (on motion)
Anterior wrist ganglion

Cooney et al Mayo Clinic J Hand Surg 1994

- 84 cases
  - compared recurrence after aspiration and injection
  - with excision
- aspiration 20/24 recurrences
- excision 12/72 recurrences
  - 6/72 complications
    - infection(2), tendinitis(2), RSD(2)
Excision of anterior wrist ganglia

- Bruner type zig-zag incision centred over the scaphoid tubercle
  - transverse, longitudinal
- dissect with care
  - pedicle
  - artery
    - incise wall 1-2mm from artery
- open anterior aspect of FCR tunnel
- cruciate incision of capsule
Dorsal wrist ganglia

- Emerge between the tendons of extensor pollicis longus and extensor digitorum
Methods of treatment

• expectant
• Compression and bursting
• Aspiration
  – with or without injection
• radiotherapy
• injection of sclerosant
• cross fixation with a suture
• Subcutaneous sectioning with a tenotomy knife
• surgical excision
Expectant treatment

• 40-50% spontaneously disappear
  – Carp and Stout 1928, McEvedy 1954

• symptomless ganglia

• diagnosis
  – site
  – nature
  – transillumination
  – U/S?
  – aspiration
Direct digital pressure

- ancient
- 24 patients, 8yrs F/u, 16 cured,
- 44% recurrence rate
- 56% cure
  - 40-50% spontaneous
  - 16%-6% advantage?
Heister, 1743

“the inspissated matter of a ganglion may often be happily dispersed by rubbing the tumour well each morning with the fasting saliva”

“A ganglion may speedily vanish by a blow with a mallet armed with lead”

NOT by “rubbing them with the hand of a dead man and the like superstitious ceremonies”
A.W. Fowler, Mid-Glamorgan 1977

- Direct digital pressure
  - often painful
  - often fails to rupture the ganglion
- mallet concealed
- back to patient
- single sharp blow to the top of the ganglion
Treatment by thread technique

**Gang et al Bengazi, J Hand Surg 1988**

- 2/0 Mersilk on a straight needle
- passed twice through the ganglion
- pressure applied
- no LA(3 minutes)
- 2 x 1/52 OPD
- 1/12 f/u for 1 yr
Seton technique

- Low grade chronic inflammation
- 62 cases
  - 5% recurrence
  - 12% infections
    - staph, E.Coli
Excision of ganglia

• Highest success rate for cure
  – Angelides and Wallace *J of Hand Surg* 1976
    • of 346 dorsal ganglia only 3 recurred (1%)
  – Clay and Clement *J of Hand Surg* 1988
    • of 62 only two recurred (3%)

• Complications
  • persistent wrist pain
  • instability
Dorsal wrist ganglia

- Transverse skin incision (1.5x dia.)
  - Langer’s lines
- “professional pride”
  - safer to incise and follow extent from within
- excise area of dorsal capsule
Tourniquet/GA or LA  Nelson et al
Cleveland JBJS 1972

- Surgical excision with tourniquet and local anaesthetic
  - 16% recurrence rate
- Surgical excision with tourniquet and general anaesthetic
  - 6% recurrence rate
Aspiration of ganglia

- Hyaluronidase
  - naturally occurring enzyme
  - breaks down hyaluronic acid
  - depolymerizing action on polysaccharide
  - liquefies the contents
  - aids penetration of cyst wall
Wrist and hand ganglion treatment with hyaluronidase injection and FNA: a tropical African perspective

- 349 ganglia
- 20ml syringe, 21Fr needle
- stabilise ganglion
- distract patient
- Carefully insert needle
- via oblique tract

- 1ml hyalase injected
- wait 30 seconds before aspiration
  - “ganglion contents flow freely into syringe”
- bandage 1/7
Wrist and hand ganglion treatment with hyaluronidase injection and FNA:

a tropical African perspective **Otu, Nigeria, J of R.C.S.Ed 1992**

- 6mths f/u
- Cure rate 95%
  - sustained collapse and disappearance of the cyst
- 3 mths mean time to recur
- **NO COMPLICATIONS**
Wrist and hand ganglion treatment with hyaluronidase injection and FNA:

a tropical African perspective **Otu, Nigeria, J of R.C.S.Ed 1992**

- **Keloid scars a problem in susceptible populations**
  - cosmesis initial presentation

- **Cost**
  - £9 per vial of hyaluronidase
Treatment of ganglia of the hand and wrist with aspiration and injection of hydrocortisone
Holm and Pandy, Derby The Hand 1973

• LA
• Aspirate
• inject 1-1.5mls of depomedrone
• recurrence rate of 20%
• Concluded
  • simple procedure fair result saving operating time for the surgeon and working days for the patient
Improving the results of ganglion aspiration by the use of hyaluronidase

Paul and Sochart, Manchester, J of Hand Surg 1997

• Prospective randomized trail

• comparing
  – 35 pts with aspiration with steroid injection alone
  – 35 pts with prior instillation of hyaluronidase and then depo
Improving the results of ganglion aspiration by the use of hyaluronidase

Paul and Sochart, Manchester, J of Hand Surg 1997

• Both wrist and hand ganglia
  – one surgeon
  – two year f/u

• Procedure
  • LA, 16G needle, aspiration(confirm diagnosis)
  • 1500 units of Hyalase in 0.5mls of water
  • 20 minutes(allow for the enzyme to work)
  • second needle to aspirate fully
  • inject 40mg of depomedrone
  • compression bandage for three days
Improving the results of ganglion aspiration by the use of hyaluronidase

Paul and Sochart, Manchester, *J of Hand Surg* 1997

- **Cure rate**
  - Hyalase Group 89%
  - Conventional group 57%
  - P=0.0072
Improving the results of ganglion aspiration by the use of hyaluronidase

Paul and Sochart, *Manchester, J of Hand Surg 1997*

• Results
  – Excellent
    – no residual lump palpable
  – Good
    – ganglion smaller and patient satisfied
  – Poor
    – ganglion recurred (repeated aspiration)
    – patient was dissatisfied
Post aspiration

• Free or wrist immobilised?

• Range
  – free to 3 weeks in cast

• free or compression bandage?
Change management

• Expectant
  – children, symptomless, waiting list review

• Aspiration
  – with hyalase and depomedrone injection
    • immobilise?
    • Repeat

• Surgical excision
  – for failure of above, symptomatic,
Thank you