The Hemiparetic Shoulder – Handle with care

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October 2009
Learning Objectives

• To have a good understanding of the anatomy around the shoulder joint and the way in which it moves
• To gain an understanding of the complications affecting the shoulder post stroke
• To be able to identify patients who may be at risk of developing shoulder pain
• To be aware of the importance of careful handling of the hemiplegic shoulder
Incidence

• Glenohumeral joint (GHJ) subluxation is reported to be present in 17 – 81% percent of patients with hemiplegia following stroke

• Hemiplegic Shoulder Pain (HSP) has a reported incidence of 5 – 84% Broeks et al 1999
Onset

- GHJ subluxation occurs in the initial/early flaccid stages
- Hemiplegic shoulder pain (HSP) has an average onset of 2 – 3 months post stroke
Effects

• Prolongs rehabilitation
• Associated with reduced range of motion which then
  – Interferes with ADL’s
  – Impedes balance
  – Difficulty with transfers and mobility
Why is it important?

• To facilitate early identification of patients who may be at risk of developing shoulder pain
• To allow us to put in place strategies to avoid the development of shoulder pain in “at risk patients”
Hemiplegic shoulder pain should be viewed as a largely preventable complication after stroke
Aetiology

• GHJ subluxation is due to paralysis of the rotator cuff muscles
• A number of co-factors are related to shoulder pain but the contribution of each one is unclear
• Likely that a single cause of HSP does not exist
Overview of Shoulder Anatomy
The Shoulder Girdle

- Acromioclavicular Joint
- Glenohumeral Joint
- Clavicle (Collarbone)
- Humeral head
- Humerus
- Scapula (Shoulder blade)
Structures That Help Stabilise the Glenohumeral Joint

- Glenoid Labrum
- Joint capsule
- Ligament
- Rotator Cuff
Rotator Cuff Muscles

- Supraspinatus
- Infraspinatus
- Teres Minor
- Subscapularis
  - Blend in and reinforce the joint capsule
Supraspinatus

- **Origin:** supraspinous fossa
- Passes through the coracoacromial arch where it becomes susceptible to impingement
- **Insertion:** greater tubercle of humerus
- **Action:** initiates abduction of arm
Infraspinatus

- **Origin**: in infraspinous fossa
- **Passes**: around the back of the humeral head
- **Insertion**: middle facet of the greater tubercle of humerus
- **Action**: laterally rotates arm
Teres Minor

- **Origin**: superior part of lateral scapula border
- Travels below infraspinatus
- **Insertion**: inferior facet of greater tubercle of humerus
- **Action**: laterally rotates arm
Subscapularis

- **Origin**: subscapular fossa on the anterior surface of scapula
- **Travels on**: the medial side of the humerus
- **Insertion**: lesser tubercle of humerus
- **Action**: medially rotates and adducts the arm
How do the Rotator Cuff Muscles Work Together

• Each muscle has it’s own individual rotatory element
• Together they stabilise the humeral head in the glenoid fossa
• Provide a compressive force into the glenoid fossa when all rotary forces are added together
Scapula Stabilisation

- Essential for normal shoulder girdle function
- Important to remember scapulohumeral rhythm
- Trapezius and Serratus Anterior most important stabilisers
- Need stability and mobility at both joints to achieve full range of motion
What can go wrong after stroke?

• Hemiplegia/hemiparesis
• Abnormal tone/spasticity
• Other neurological deficits
  – Sensation, proprioception, co-ordination
• Immobility
• Subluxation
• Impingement
• Soft tissue injury
• Brachial Plexus or peripheral nerve injury
• Shoulder-hand syndrome
• Pain related to the area of the lesion
Impingement

• Compression of soft tissue between humeral head and coracoacromial arch

• During movement of the glenohumeral joint impingement is minimised by:
  – Lateral rotation of the humerus to alter the position of the tubercles of the humerus
  – Lateral rotation of the scapula

• Need to consider:
  – Postural and degenerative changes with age
  – Effect of tonal changes
Subluxation

- **Normal**
  - Scapula held in lat rotation.
  - Posterior deltoid & supraspinatus ACTIVELY hold head of humerus in glenoid fossa.
  - Superior capsule and coracohumeral ligament PASSIVELY restrain head of humerus

- **Subluxation:**
  - Incidence substantially higher in patients with severe paralysis
  - More commonly develops in flaccid stage
Common Subluxations due to Hemiplegia

A

Inferior GHJ Subluxation

B

Anterior GHJ Subluxation

C

Superior GHJ Subluxation
Flaccid Shoulder

- Paralysis of lateral rotators of scapula => glenoid fossa angled downwards
- Paralysis of deltoid and supraspinatus
- Superior capsule and coracohumeral ligament ineffective due to angle of glenoid fossa

⇒ Unopposed gravitational pull on arm
⇒ Inferior subluxation of humeral head
Relationship of Subluxation and HSP

• Shoulder subluxation itself is not painful but improper handling of the subluxed shoulder can cause HSP (Bobath 1990)

• Demonstrated by times of onset:
  – Shoulder subluxation → first few weeks post stroke
  – HSP → two – three months post stroke

• Evidence is largely inconsistent
How do we look after a hemiplegic upper limb?

- HSP can potentially be avoided if we start prophylactic management straight away.

- All members of the MDT, the patient and carers need to be educated on the correct way to handle a vulnerable shoulder.
How do we look after a hemiplegic upper limb?

- Adequate support and protection of the hemiplegic arm are essential at all times
  - Pillows to support shoulder and maintain alignment
  - Elevation to prevent oedema
  - Positions that avoid patterns of spasticity
  - Bexhill arm rest on wheelchair

- The affected arm must never be pulled or used as a lever to aid transfers
How do we look after a hemiplegic upper limb?

• Involvement of affected UL in activity
  – Provide sensory stimulation
  – Prevent development of learned non-use
  – Facilitate patient to attend to that UL

• Avoid impingement during passive or active assisted movements
Key Handling Points

• Manual reduction of subluxation before elevating arm
• Medial rotation must accompany flexion
• Lateral rotation must accompany abduction
• Scapula lateral rotation must accompany both flexion and abduction
• How much range is enough?
  – Go for functional range
• Remember these points when assisting patients with functional tasks
Other Management Options

- Shoulder cuffs, slings, braces
  - Variety of different types
  - No radiological evidence supporting a reduction in subluxation

- Advantages
  - Visual stimuli to handle with care
  - Can prevent trauma during ambulation

- Disadvantages
  - Can cause immobility
  - Can encourage flexor patterning of spasticity
  - Alters alignment of upper quadrant
Other Therapy Management Options

• FES
• Taping
• Heat
• Ice
• Acupuncture
• Electrotherapy
• Hydrotherapy
Summary

• HSP should be viewed as a largely preventable complication of stroke
• It is the responsibility of all members of the MDT to ensure they handle vulnerable upper limbs with care
• Nursing interventions such as positioning, transferring and assisting ADL’s are rehabilitative interventions (Seneviratne et al 2005)
• When handling the hemiplegic arm consider all joints involved and the effect your handling is having
• Ensure adequate support is provided for the arm whatever position the patient is in
References


