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1.Upper Extremity Function - General
Principles and Therapies

3.Range of Motion and Post-Stroke
Spasticity

NEW Delivery Of Stroke Rehabilitation to Optimize Functional Recovery

2. Shoulder Pain and Complex Regional Pain Syndrome (CRPS) following Stroke

Note

Shoulder pain after stroke is often multifactorial and may result from stroke-related hemiplegia, spasticity, injury or acquired musculoskeletal conditions stemming from impaired joint and soft tissue integrity. Pain may be from a combination of neuropathic, nociceptive or nociplastic causes. Accurate diagnosis of etiology is crucial for optimal management.

Refer to Section 3 for additional information on Spasticity

For these recommendations, 'Flaccid' is defined as the state of low muscle tone (hypotonia) with the absence of voluntary muscle movement and diminished resistance to passive stretch.

Recommendations and/or Clinical Considerations

2.1 Prevention of Hemiplegic Shoulder Pain and Subluxation

- i. Joint protection strategies should be applied during the flaccid stage of recovery to prevent or minimize shoulder pain and injury. Strategies include:
 - a. Positioning and supporting the upper extremity when the individual is at rest [Strong recommendation; Moderate quality of evidence].
 - b. Protecting and supporting the shoulder in neutral rotation and forearm in neutral supination/pronation using a modified lap tray designed for this purpose during wheelchair use [Strong recommendation; Moderate quality of evidence].
- ii. Overhead pulleys should not be used [Strong recommendation; Low quality of evidence].
- iii. The upper extremity should not be moved passively beyond 90 degrees of shoulder flexion or abduction, unless the scapula is upwardly rotated, and the humerus is laterally rotated [Strong recommendation; Moderate quality of evidence].
- iv. Healthcare staff, individuals with stroke, family and caregivers should be educated to correctly protect, position, and move the affected upper extremity [Strong recommendation; Low quality of evidence].

Section 2.1 Clinical Considerations

1. Healthcare staff, individuals with stroke, family, and caregivers should avoid pulling on the affected upper extremity.
2. The affected upper extremity should be protected and supported during functional mobility such as transfers.
3. Shoulder slings should only be considered in the flaccid stage when no other upper extremity support is possible. After the flaccid stage, use of slings should be discouraged, given they may reduce upper extremity use, inhibit arm swing, contribute to contracture formation, and decrease body image.

2.2 Assessment of Hemiplegic Shoulder Pain

- i. The assessment of the painful hemiplegic shoulder should focus on determining the cause and include evaluation of tone, active movement, changes in length of soft tissues, alignment of joints of the shoulder girdle, trunk posture, levels of pain, musculoskeletal changes in the shoulder, and impact of pain on physical and emotional health [Strong recommendation; Low quality of evidence].

Section 2.2 Clinical Considerations

1. The diagnosis of post-stroke CRPS should be considered when typical causes of shoulder or hand pain, such as acute trauma or bony fracture have been ruled out. Clinicians should be aware of post-stroke CRPS and its clinical presentation to facilitate early diagnosis and treatment. When available, if post-stroke CRPS is suspected, referral to physiatry or other physician with experience in stroke rehabilitation or pain should be considered.

2.3 Management of Hemiplegic Shoulder Pain

- i. Treatments for hemiplegic shoulder pain related to limitations in range of motion may include gentle stretching and mobilization techniques within pain-free range and increasing external rotation and abduction [Strong recommendation; Low quality of evidence].
- ii. Taping of the affected shoulder is recommended to reduce shoulder pain in the acute phase of recovery [Strong recommendation; High quality of evidence].
- iii. For patients with a flaccid upper extremity, electrical stimulation should be considered [Strong recommendation; Moderate quality of evidence].
- iv. The use of shoulder orthoses may be considered to reduce shoulder subluxation in the flaccid stage [Strong recommendation; Moderate quality of evidence].
- v. If there are no contraindications, non-steroidal anti-inflammatory (NSAID) analgesics (oral or topical) could be considered for pain relief on an individual basis [Conditional recommendation; Low quality of evidence].
- vi. Chemo-denervation botulinum toxin is recommended for the treatment of hemiplegic shoulder pain thought to be related to spasticity [Strong recommendation; High quality of evidence].
- vii. Subacromial corticosteroid injections may be used in patients when pain is thought to be related to injury or inflammation of the subacromial region (rotator cuff or bursa) in the hemiplegic shoulder [Conditional recommendation; Moderate quality of evidence].
- viii. Acupuncture should be considered, in addition to conventional rehabilitation, in the treatment of hemiplegic shoulder pain [Conditional recommendation; High quality of evidence].
- ix. Extracorporeal shock wave therapy (ESWT) may be considered in the treatment of hemiplegic shoulder pain [Strong recommendation; Moderate quality of evidence].

Section 2.3 Clinical Considerations

1. Active range of motion should be increased gradually in conjunction with restoring alignment and strengthening weak muscles in the shoulder girdle.

Note: For additional information on pain management, refer to Section 9 on Central Pain.

2.4 Hand Edema

Recommendations

Note, no evidence-based recommendations are included for this section.

Section 2.4 Clinical Considerations

1. For Individuals with stroke who experience hand edema, the following have been shown to have some benefit:

- a. Active, active-assisted, or passive range of motion exercises.
- b. Elevating the arm when at rest if possible.
- c. Retrograde massage.
- d. Gentle joint mobilization for the hand and fingers.
- e. Compression, including use of compression garments with appropriate monitoring by health professionals with expertise in use and fit.

2.5 Complex Regional Pain Syndrome (CRPS) Management

- i. Early assessment by a physiatrist or other physician with expertise in management in stroke for consideration of an early course of oral corticosteroids, on a tapering regimen, should be considered to reduce swelling and pain among patients with no contraindications [Early – Strong Recommendation; High quality of evidence].
- ii. Acupuncture may be considered as an adjunct therapy to reduce pain in individuals with CRPS [Conditional recommendation; Moderate quality of evidence].
- iii. Extracorporeal shock wave therapy (ESWT) may be considered as an adjunct therapy to reduce pain in individuals with CRPS [Strong recommendation; High quality of evidence].

Section 2.5 Clinical Considerations

1. Clinicians should be aware of CRPS and its clinical presentation to facilitate early diagnosis and treatment. When CRPS is suspected, early assessment by a physiatrist or other physician with expertise in stroke is essential for consideration of treatment with oral corticosteroids. Diagnosis of CRPS clinical and is based on the presence of pain accompanied by other supportive sensory, vasomotor, pseudomotor/edema and motor/trophic signs and symptoms, as detailed in the revised International Association for the Study of Pain (IASP) (or Budapest) criteria. This includes hyperalgesia/allodynia, temperature asymmetry, skin color changes or asymmetry, edema, sweating changes or asymmetry, decreased range of motion, motor dysfunction, and trophic (hair, nail, skin) change.
2. There is currently no established protocol for corticosteroids. A reasonable early course of corticosteroids could include starting at 30 – 50 mg daily of 3–5 days and then tapering doses over 2–3 weeks.

Rationale

+

System Implications

+

Performance Measures

+

Implementation Resources and Knowledge Transfer Tools

+

Summary of the Evidence

+

Stroke Resources



Core Elements of Delivery of Stroke Prevention Services



Post-Stroke Checklist



Virtual Stroke Care Implementation Toolkit

Post Stroke Checklist

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Stroke Engine

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3. Range of Motion and Post-Stroke Spasticity

