Chapter 13
Post-Stroke Pain

Pippa Tyrrell and Anthony K.P. Jones

Abstract Pain is a common and often distressing complication of stroke, which can have a negative impact on rehabilitation and recovery. It most commonly affects the shoulder and upper limb and is usually classified as either central post-stroke pain (CPSP) or post-stroke shoulder pain. Pre-morbid pain conditions, sometimes exacerbated by immobility, tension-type headaches, spasticity-related pain, and widespread pain syndromes, may contribute to the pain experience following stroke. Careful clinical assessment is needed to ascertain the underlying cause(s) and instigate appropriate treatment and monitoring. All members of the multidisciplinary team, both in hospital and after discharge, need to be aware of the problems associated with post-stroke pain and the need for specialist referral where necessary.

Keywords Pain • Pain syndromes • Neuropathic pain • Stroke • Central Post Stroke Pain

Key Messsages

- Pain is a common and troublesome problem following stroke and can interfere with rehabilitation. Pain in the affected shoulder and upper limb is most common.
- Clinicians should know how to distinguish different types of pain (neuropathic, regional) as management differs. The SLANSS scale is easy to use in practice and helps identify neuropathic pain.
- The entire multidisciplinary team needs to be aware of the problem of pain following stroke and the need for rapid assessment and treatment. Pain in people with impaired level of consciousness or communication difficulties may be particularly challenging to recognise and may only become apparent during therapy or nursing procedures.

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- Management of pain after stroke requires a holistic approach, including appropriate positioning, mobilisation, and pharmacological management.
- Pain usually improves with time, particularly when managed promptly, but sometimes develops late. Clinicians should always ask about pain at post-stroke follow-up and ensure that people are referred rapidly for appropriate management.
- National clinical guidelines, such as the UK InterCollegiate Guidelines for Stroke, give detailed advice on management. Pain can usually be managed by the stroke team, but it is important to refer people with pain that is proving difficult to manage to appropriate pain specialists early.

Introduction

Post-stroke pain is a troublesome and disabling condition. Early reports in the literature tended to focus on post-stroke neuropathic pain (sometimes called central post-stroke central post-stroke pain (CPSP) or thalamic pain) with accounts of people presenting late to neurologists with unilateral, usually upper-limb, intractable pain with abnormal and often very distressing sensory disturbance. More recent literature has emphasised the importance of distinguishing types of post-stroke pain to ensure appropriate treatment and the importance of early intervention to ensure the best chance of recovery. Everyone treating people with stroke, both in hospital and the community, should be aware of the different types of post-stroke pain and how to help people access appropriate treatment rapidly.

Incidence

Post-stroke shoulder pain is reported to occur in 9–40 % of patients following stroke, depending on study design and patient selection [1, 2]. The temporal pattern of post-stroke pain varies. In some patients, it develops early and resolves over time; 80 % of people in one study with any type of pain at 2 months post-stroke had almost resolved or completely resolved symptoms by 6 months [2]. A study of shoulder pain after stroke showed that while it resolved in most patients, some who had not had pain at 4 months post stroke had developed it a year later [3]. A study of all types of pain in patients in the Lund Stroke [4] Register found that 60 % of people with pain at 4 months post stroke had upper limb pain, 35 % had pain [5] in lower limbs or elsewhere, and 7 % had headache.

Types of Post-stroke Pain

Musculoskeletal Pain

Musculoskeletal pain, most frequently affecting the back and hips [6], is the most common cause of pain in people with stroke, reflecting partly its frequency in the general population, particularly in older people who are at higher risk of stroke. It may pre-date the stroke and may be particularly troublesome following stroke, when it may be exacerbated by immobility or impaired movement.

Regional Shoulder Pain

This is the most common cause of pain occurring following stroke and may occur immediately following stroke or develop over time. It is more common in people with weakness of the upper limb [7]. It may be present at rest but may more commonly be associated with movement, particularly shoulder abduction or rotation. It may be associated with shoulder subluxation and/or spasticity of the upper limb, but shoulder subluxation is not always associated with pain. It is sometimes associated with ipsilateral sensory loss.

Central Post-stroke Pain (CPSP)

CPSP is characterised by its unpleasantness and is often described as being unlike any pain experienced previously. Patients may describe it as unpleasant burning, numbness, or coldness and use bizarre descriptors such as ‘clawing my arm from the inside’ or ‘a red-hot poker in my muscles’ [8]. The intensity of pain can be exacerbated by stress or cold and alleviated by warmth or distraction. Pain is very burdensome, even when of low intensity, [9] interferes with sleep, [10] and impacts significantly on quality of life. It is often associated with allodynia (defined as pain that is evoked by a stimulus that is not normally painful; e.g., brushing or light touching) and dysaesthesia (an unpleasant abnormal sensation that may occur with or without a physical stimulus) [11]. Patients may describe pain or unpleasant sensations associated with light touch from clothing or bed clothes, from cold, or occurring spontaneously. This description of CPSP is not unique to stroke and is common to other types of central deafferentation pain, including those caused by demyelination, syringomyelia, and traumatic brain injury.

Complex Regional Pain Syndrome

This is a severe neuropathic type of pain occurring at an extremity in association with vascular/autonomic changes that may initially be associated with hyperaemia but subsequently may be associated with reduced blood flow and atrophic changes. Although this is well described in textbooks, in the authors' experience it is rare in association with stroke. Early mobilisation in patients with stroke may explain why this is now rarely seen.

Headache Post Stroke

Headache following all types of stroke is common but is particularly associated with some stroke syndromes at onset, particularly subarachnoid or intracerebral haemorrhage, cervical artery dissection, migraine-associated stroke, and cortical venous sinus thrombosis [12, 13].

Spasticity Pain Post Stroke

As described in Chap. 10, spasticity is a common complication of upper motor neuron lesions such as stroke, and even with best practice physiotherapy may be a troublesome complication, causing limitation of movement, functional impairment, or pain. In one longitudinal study of people with first-ever stroke and upper limb weakness, almost half of the patients assessed developed some degree of spasticity in the first year [14].

Management of Post-stroke Pain

Musculoskeletal Pain

Many people with stroke have pre-morbid musculoskeletal pain that is exacerbated by stiffness and immobility. Careful clinical assessment, together with optimisation of moving and handling techniques to avoid pain, are essential. Simple analgesia taken regularly is helpful.

Shoulder Pain

Post-stroke shoulder pain can be extremely troublesome. It is made worse by movement of the shoulder, particularly abduction or rotation, and so impacts on activities of daily living such as washing and dressing and rehabilitation. There is little

evidence that shoulder strapping or wheelchair attachments (to support the upper limb) prevent subluxation, reduce pain, or improve function [15] although these may be used to make it clear to carers that the shoulder is at risk of damage from incorrect handling or positioning. Many people find supporting the affected arm on a pillow while sitting makes it more comfortable. There is insufficient evidence to support electrical stimulation for regional shoulder pain, [16] although it may prevent post-stroke shoulder subluxation [17]. Although subacromial injection of corticosteroids has been used clinically and anecdotally may provide rapid relief, there is no good evidence to support its use [18]. Simple analgesia should be offered regularly.

Central Post-stroke Pain (CPSP)

The evidence for efficacy of drug therapy in CPSP is based on quite small numbers of clinical trials, some of which were on mixed neuropathic pain syndromes. Current practice is therefore based partly on specific trial evidence on CPSP and partly on management of other causes of neuropathic pain. There is specific controlled trial evidence for efficacy of amitriptyline, [19] pregabalin, gabapentin, [20] and opioids [21] in central neuropathic pain, although generally opioids are not used as first-line management because of the potential side effects, particularly constipation.

Recent NICE guidelines for the management of neuropathic pain [22] suggest that a choice of amitryptiline, duloxetine, gapabentin, or pregabalin should be offered as initial treatment. (Nortryptiline is another alternative that is often better tolerated than amitryptiline.) NICE guidelines advocate that if initial treatment is not effective or not tolerated, then one of the remaining three agents should be offered, with further switching if the second and third drugs are not effective or tolerated. Tramadol is recommended to be considered by NICE only as acute rescue therapy, and capsaicin cream is recommended to be considered by NICE in individuals with localised neuropathic pain who wish to avoid or who cannot tolerate oral treatment. The Royal College of Physicians' National Clinical Guideline for Stroke [23] gives details of dose titration for amitriptyline, gabapentin, and pregabalin, but clinicians should always check with an up-to-date national formulary before prescribing. Patients need regular clinical reviews of progress to consider alterations in treatment (including treatment withdrawal) and referral to a specialist pain service if necessary. Rarely, patients who do not respond to drug therapy may be referred for transcranial magnetic stimulation, motor cortex stimulation, or deep brain stimulation of the thalamus or brainstem, which are available in a few specialist units [24].

Complex Regional Pain Syndrome

The main treatment is as for other types of post-stroke pain, in addition to maintaining as much movement as possible of the affected limb.

Headache

Understandably, patients in the recovery phase of stroke may find headache particularly distressing, worrying that it may be a sign of a further stroke. Careful clinical assessment followed by reassurance where appropriate and assurance of adequate hydration together with simple analgesia and distraction may be helpful.

Spasticity

As described in Chap. 10, when pain is present together with spasticity following stroke, then both the pain and the spasticity need to be addressed simultaneously employing passive stretching, antispasmodic therapy including botulinum toxin, splints, and analgesia. There is no evidence for benefit of passive stretching together with neuromuscular electrical stimulation [25] for either spasticity or pain. Early recognition of spasticity, together with physiotherapy and occupational therapy techniques to reduce it, is important, as the spasticity may exacerbate post-stroke pain.

Multidisciplinary Team Approach to the Management of Post-Stroke Pain

The management of pain after stroke can be challenging. Patients may be medically unstable, which makes diagnosis and management particularly difficult. Cognition and communication difficulties can make it difficult to assess the presence, nature, and severity of pain, and co-morbid illnesses and concurrent medication may complicate pharmacological approaches to management. The entire multidisciplinary team needs to be aware of the problem of pain and the importance of prompt assessment and treatment. If pain only occurs on movement, it may only be nursing and therapy staff who are aware of the patient's pain, which may only be communicated by facial expression, groaning, an increase in pulse or respiratory rate when being moved, or other non-specific signs of distress. Post-stroke shoulder pain typically occurs or worsens with shoulder abduction and so may only become apparent when the patient is being dressed or washed. Pain may make a patient reluctant to engage in therapy or impact on sleep patterns, leaving him or her too tired to do so. It has a significant impact on mood, which in turn has a negative effect on rehabilitation. It may delay discharge and transfer of care and can make life at home more difficult and distressing.

Some patients with post-stroke pain may be psychologically distressed, which may contribute to the post-stroke pain, particularly if associated with sleep disturbance. Although there is no evidence for the benefit of cognitive behavioural therapy for post-stroke pain, this may be beneficial in certain patients who are able to engage with this.

Clinical Assessment of the Patient with Post-Stroke Pain

A careful history is essential to the assessment of pain. If the patient is unable to communicate, then it is important to take a history from family and friends, the general practitioner, and other members of the multidisciplinary stroke team who have had the opportunity to observe the patient at different times of day or engaged in different activities. Specifically, the clinician should ask about pre-morbid pain or painful conditions (such as arthritis or a previous fracture), use of analgesics or other pain-relieving strategies, and any pre-morbid mood disturbance such as depression or anxiety. Asking the patient to describe the pain in their own words may elicit the bizarre descriptors that are associated with central neuropathic pain. In addition, some patients may describe a very unpleasant sensation that they feel is not 'true pain' but may be as unpleasant as clearly defined pain. In the authors' experience, it is best to treat such sensations as pain, as they can be as disabling. Exacerbating and relieving factors, intensity, and associated symptoms such as sleep disturbance should also be ascertained. A full musculoskeletal and neurological examination is required to assess the patient completely. Neurological examination includes careful assessment of the extent and distribution of sensory loss (including light touch, temperature, and pinch) and of motor deficit. Musculoskeletal examination includes an examination of the affected joints both at rest and on passive and active movements.

Distinguishing neuropathic pain from musculoskeletal pain is important in order to start the right treatment early. The SLANSS scale [26] is a self-reported questionnaire that is designed to identify pain of neuropathic origin and is useful in patients who can communicate. For those with communication disorders, the use of communication charts may be helpful.

Pain may continue to be a problem or may worsen or occur for the first time weeks or months following stroke. Best practice is for all patients to receive a 6-month post-stroke assessment, [27] which should include an assessment of pain symptoms. The Greater Manchester Stroke Assessment Tool (GM-SAT) [28] is one example of a structured 6-month assessment and includes the SLANSS scale to guide treatment. GM-SAT also has an easy access version [29] that may be helpful for people with communication difficulties. Once the problem of post-stroke pain has been identified, it is important that people have access to appropriate services in primary and secondary care so that pain can be assessed and managed.

Prognosis

Prognosis of post-stroke pain following diagnosis is variable. CPSP can sometimes, particularly with prompt treatment, resolve quite quickly on relatively small doses of medication, although it can become extremely troublesome and difficult to manage. Expert specialist pain management is then necessary. Post-stroke shoulder pain

generally improves if upper limb movement improves but again can affect activities of daily living and disrupt sleep. As with stroke recovery itself, post-stroke pain may continue to improve slowly over months to years; so in the authors' opinion, patients should never be told that their pain will not improve at any stage. Headache following stroke generally settles over time with reassurance and simple analgesia. Prognosis of complex or multiple pain problems remains extremely difficult, requiring intensive multidisciplinary team input.

Conclusion

All members of the multidisciplinary team need to be aware of the importance of pain following stroke. Careful observation of the patient at rest and when engaged in activities, together with a detailed history, is necessary to ensure prompt recognition and diagnosis. Pain is not always at its worst at onset and frequently develops after an interval of time, so repeated assessments may be required. Treatment depends on the type of pain. Rapid recognition and appropriate management by the entire multidisciplinary team is necessary to ensure the best possible outcome.

Patient Questions

Q. What is the best way to manage pain after stroke?

A. Management of pain after stroke depends on the cause. The commonest type of pain is shoulder pain, affecting the weak arm, with pain around the shoulder and upper arm. It is worse on movement and can make activities such as washing and dressing very uncomfortable. Supporting the shoulder by careful positioning such as resting the weak arm on a pillow and not allowing it to hang down can help prevent and alleviate pain. Simple analgesics such as paracetamol may be helpful. One sometimes troublesome cause of pain is called central post-stroke pain and is due to abnormal processing of sensations such as touch and temperature by the brain. This pain can be very distressing, as apparently ordinary sensations are perceived as very painful. There are a variety of drugs for this type of pain, and the earlier treatment is started, the better.

Q. Does pain after stroke get better?

A. Pain after stroke nearly always gets better if the right treatment is started promptly. Patients need to know that if they get pain following stroke, even after they have gone home, they need to see someone who can assess the pain, diagnose the cause, and ensure the appropriate treatment is started. Some people need the skills of specialists such as a rheumatologist or the pain team, but the key is early treatment without delay.

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