EBM AND NECK PAIN
Z DOKAZI PODPRTA MEDICINA IN BOLEČINA V VRATU

Thierry Parlevliet, MD
Ghent University Hospital, Department of Physical and Rehabilitation Medicine, Ghent, Belgium

Abstract

This article aimed to review the scientific literature on diagnosis, prognosis and treatment of non-specific neck pain. The objective was to propose an evidence-based review on how to diagnose and to treat adults who suffer from nonspecific neck pain. Nevertheless, all conclusions should be applied with caution due to the actual weaknesses of most studies and should be applied as a guide to clinical decision making. The result is a limited number of key messages useful for clinical practice. These messages are mostly consistent with (inter)national guidelines.

Key words:

non-specific neck pain, evidence-based search, clinical guidelines, diagnosis and treatment

Izvleček

Prispevek podaja pregled znanstvene literature o diagnozi, prognozi in zdravljenju nespecifične bolečine v vratu. Naš namen je bil podatki z dokazi podprt pregled spoznanj o tem, kako prepoznati in zdraviti odrasle, ki trpijo za nespecifično bolečino v vratu. Vendar pa je potrebno vsa spoznanja uporabljati previdno, saj ima večina študij pomanjkljivosti in zato lahko služijo le kot vodilo pri kliničnem odločanju. Oblikovali smo manjše število ključnih sporočil za klinično prakso. Ta sporočila se v glavnem skladajo z mednarodnimi priporočili.

Ključne besede:

nespecifična bolečina v vratu, iskanje dokazov, klinične smernice, diagnoza in zdravljenje

INTRODUCTION

What are the most accurate diagnostic procedures, prognostic factors and therapeutic interventions for adults with non-specific neck pain? The existing scientific literature for non-specific neck pain is reviewed and critically assessed. Concerning the topic evidence- based- medicine and non-specific neck pain, the Belgian authorities prepared a text which can be used as guideline to help this patients.

The following text is based on the report published by the KCE (Belgian Health Care Knowledge Centre) (1).

BACKGROUND

Definition

Neck pain is a wide concept and many definitions exist. Non-specific neck pain can be defined as simple (non-specific) neck pain without specific underlying disease causing the pain. Symptoms vary with physical activity and over time. Each form of acute, subacute or chronic neck pain, where no abnormal anatomic structure; as cause of pain, can be identified, is non-specific neck pain. There are different opinions about duration of symptoms but according to Binder, neck pain can be acute (< 4 weeks duration), sub-acute (1–4 months duration) or chronic (> 4 months duration) (2).

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Epidemiology in the international literature

In the international literature, prevalence studies show variation in results (3-7). For instance, in a Swedish population-based study of 8356 subjects (6000 respondents, i.e.72%), 43% (48% of women and 38% of men) of the population reported neck pain. Chronic neck pain defined as continuous pain of more than 6 months duration, was more common in women (22%) than in men (16%).The Task Force on neck pain (2008) reported that depending on the case definitions used, the 12-month prevalence of neck pain ranged from 12.1% to 71.5% in the general population, and from 27.1% to 47.8% in workers. However, neck pain with associated disability was less common: 12-month prevalence estimates ranged from 1.7% to 11.5% in the general population (3).

Consequences of neck pain

Chronic neck pain may lead to substantial medical consumption, absenteeism from work and disability (3). Whatever the

duration of neck pain, pain can impair functional capacity, quality of life and can cause worry, anxiety and depression. Consequently, neck pain places a heavy burden on individuals, employers and health care services (2, 3, 6, 9). Non-specific neck pain is not just a clinical problem, it can develop into a complex disorder where physical, psychological, social, compensation and other possible forces interact to cause and lead to maintained disability (9).

Methodology

PubMed/ Medline, Embase, Cochrane and Pedro were used to identify publications concerning diagnosis, prognosis and therapy for non-specific neck pain. For a reproducible and relevant search, the medical subject heading (MeSH) used was "Neck Pain": "discomfort or more intense forms of pain that are localized to the cervical region. This term generally refers to pain in the posterior or lateral regions of the neck". The electronic search covered the period from 1998 to 2008. The refined search yielded 55 systematic reviews and 53 RCT's, of which 23 (systematic) reviews for treatment and one SR for prognosis met the inclusion criteria; and 13 RCT's met the inclusion criteria for treatment. With a second search for primary articles on diagnosis or prognosis seven publications met the inclusion criteria. Four additional publications, which met the inclusion criteria, were found by hand search.

RESULTS

Diagnosis

Key messages regarding diagnosis

- No systematic review or primary study was identified which examined the diagnostic accuracy of history-taking or diagnostic imaging in patients with neck pain. During the diagnostic procedures it is important to exclude the "red flags", and nerve-root pain (radicular pain/radiculopathy) and to confirm the diagnosis "Non-specific Neck Pain".
- Presence of radicular pain/radiculopathy can be demonstrated by the Spurling's test, traction/neck distraction, shoulder abduction test and a Valsalva's manoeuvre.
- To exclude radicular pain/radiculopathy, a (negative) upper limb tension test (ULTT) can be used.
- Local anesthetic block is useful in diagnosing facet joint spinal pain, when the clinical diagnosis remains uncertain.

In order to make the diagnosis of "Non-specific Neck pain", serious spinal pathology or nerve-root pain has to be excluded (10). In the review of Rubinstein from 2008 (10), a search was conducted to identify systematic reviews and primary studies on diagnostic procedures for the neck. This search did not identify any systematic reviews which examined the diagnostic accuracy of history-taking in patients with neck pain. For diagnostic imaging, systematic reviews were not identified for non-specific neck pain. In one systematic review (11) the authors conducted a comprehensive search to identify studies about provocative tests of the neck for diagnosing cervical radicular pain/radiculopathy. From this study, Spurling's test demonstrated low to moderate sensitivity and high specificity, as did traction/neck distraction and Valsalva's manoeuvre. The upper limb tension test (ULLT) demonstrated high sensitivity and low specificity, while the shoulder abduction test demonstrated low to moderate sensitivity and moderate to high specificity. So a positive Spurling's test, traction/neck distraction, shoulder abduction test and Valsalva's manoeuvre might be indicative of a cervical radicular pain/radiculopathy, while a negative ULTT might be used to rule it out (11).

For diagnosing chronic spinal pain of facet joint origin, controlled comparative local anaesthetic blocks of facet joints are reproducible, reasonably accurate and safe. The sensitivity, specificity, false-positive rates, and predictive values of these diagnostic tests for neck pain have been determined in multiple studies (12, 13) but the systematic review of Rubinstein (2007) mentions a false positive rate of 27% to 63%. Moreover, no consensus was found about the definition of "a successful anaesthetic block" for cervical facet joints pain. In conclusion, this invasive technique should only be used in case of uncertainty about the clinical diagnosis (12). This conclusion is supported in the systematic review of Nordin et al. (14) added by the validation experts. The Nordin review also comments on the usefulness of discography. This specific radiological technique uses provocative cervical discography injections to determine if the injection reproduces a neck-patient's usual symptoms, so that primary discogenic pain can be diagnosed and eventually treated. However, since a high proportion of asymptomatic healthy controls also reported a painful response after the injection, the authors conclude that currently discography can not be supported as a diagnostic instrument in neck pain and that it is even not clear whether its underlying premise is valid in these circumstances.

Assessment of pain and disability

Key message regarding pain and disability assessment

- To assess self-rated disability of patients with neck pain: the "Neck Disability index" is the most strongly validated instrument for self-rated disability.

Four publications (15–18) investigated pain and disability assessment (including questionnaires) in non-specific neck pain. The "Neck Disability Index" (NDI) is the most widely used and most strongly validated instrument for assessing

self-rated disability in patients with neck pain. It has been used effectively in both clinical and research settings in the treatment of this very common problem (15, 16). This is confirmed in a recent review provided by the validation experts (19).

Prognosis

Key message regarding prognosis

- There are a limited number of publications regarding prognostic factors for non-specific neck pain. A few indicators of a less favorable prognosis of neck pain were identified, of which older age and concomitant low back pain were the most consistent. Also there are indications that pathologic radiological findings are not associated with a less favorable prognosis. However, the severity of pain and a history of previous attacks seem to be associated with worse prognosis.

One (systematic) review and two prospective cohort studies were found considering prognostic factors for non-specific neck pain (20, 21, 22). There is limited evidence regarding prognostic factors related to the course of non-specific neck pain. For the few studies reporting on prognostic factors the main shortcomings are the sample size and the lack of appropriate analyses techniques. Bearing these limitations in mind there are some indications that there is no association between localization (e.g. radiation to the arms) and worse outcome. Furthermore there are some indications that there is no association between pathologic radiological findings (e.g. degenerative changes in discs or joints) and less favorable prognosis (more pain, lower level of functionality or less general improvement, more utilization of health care, more lost days of work) (20). However, the severity of pain and a history of previous attacks seem to be associated with a worse prognosis (20). Further, three of the studies included in the systematic review report on age as a prognostic factor in only one of them age proves to be a prognostic factor.

Treatment

a) Manual therapy

Target joint motion therapies

Target joint therapy involves targeted joint motion which includes manipulation, mobilization and traction. *Manipulation* is used to reduce pain and improve range of motion. Manipulation involves a high-velocity thrust that is exerted through either a long or short lever-arm (23). *Mobilization* of the cervical spine involves low-velocity (no thrust) passive motion. Manual and mechanical traction is a technique applied with a tractive force to the neck to separate two joint partners (24, 25).

Key message regarding treatment with target joint therapy

- Drawing conclusions based on the available evidence is difficult: treatment modalities are not always precisely described and the participants are not always patients with non-specific neck pain (sometimes inclusion of participants with WAD grade I and II). Taking these remarks into account, results show that the effectiveness of manipulation or mobilization alone for acute or chronic non-specific neck pain remains inconclusive. Manipulation and/or mobilization within a multimodal approach with exercises however appears effective for chronic non-specific neck pain for pain as well as for function in the short- and long-term follow-up. The existing evidence on cervical traction is limited and the evidence of possible benefit remains unclear.

Ten systematic reviews (21, 25-34) analyzed manipulation or mobilization as a possible noninvasive intervention. In the systematic review of Kay et al, manipulation and mobilization combined with exercises are studied within a multimodal approach (34). Only one systematic review assessed whether traction, either alone or in combination with other treatments, improves pain, function/disability and global perceived effect for mechanical neck disorders (25). In the publication of Gross (35), the intermittent traction is discussed as one possible conservative treatment. One additional RCT was found on effects of two different types of manipulation (36).

The comparison of different treatment modalities provided as single interventions (i.e. manipulation or mobilization or exercises or massage or physical modalities) does not provide evidence for differences in pain or disability outcomes (21, 28, 29). Manual therapy (involving mobilization, manipulation) combined with exercises (supervised) seems effective particularly in the treatment of patients with chronic non-specific neck pain, for pain as well as for function in the short- and long-term follow up (21, 28-30, 34, 35). But for manipulation and mobilization combined with other modalities as advice or home exercises, no pain relief or improvement in function in mechanical neck disorders was found (28, 35). Although rare, associated negative effects of manipulation can be headache, radicular pain, thoracic pain, increased neck pain, distal paresthesia, dizziness, and ear symptoms (21).

Soft tissue therapies

Soft tissue therapy involves massage. Massage is a manipulation of the soft tissues of the human body with the hand, foot, arm or elbow on the structures of the neck (37). Techniques include fascial techniques, cross fiber friction, non-invasive myofascial trigger point techniques and shiatsu massage.

Key message regarding treatment with soft tissue therapies

- Massage was never described in sufficient detail to know for sure how it was performed. The limitations of existing studies prevent from drawing any firm conclusion on the effectiveness of massage therapy for non specific neck pain. The evidence on possible beneficial effects of specific massage techniques remains unclear.

Four systematic reviews assessed the effect of massage on pain and function (31, 35, 37, 38) and two of them (37, 38) had similar conclusions. All reviews identified major methodological weaknesses e.g. often a lack of uniform definition of the technique and dosage. Therefore no general conclusion can be made that supports massage as treatment for non-specific neck pain.

b) Exercise

Exercises involves bodily activities related to the neck region. These can be shoulder exercises, active exercises, stretching, strengthening, postural, functional, eye-fixation and proprioceptive exercises for the treatment of non-specific neck pain (34).

Key messages regarding treatment with exercises

- There is evidence that exercise (under supervision) can be effective for the treatment of non-specific chronic neck pain to diminish pain and improve function in the short-term as well as in the long-term. Strengthening, stretching, proprioceptive (eye-fixation) and dynamic resisted exercises are treatments that can be effective. Home exercises (not supervised), group exercises and neck school (for a heterogeneous group) are not supported by evidence.

Two systematic reviews were found on this topic (34, 39): both included non-specific neck pain as well as whiplash associated disorders grade I and II with the same complaints as non-specific neck pain patients. Two other systematic reviews dealt with various techniques among which also exercises (28, 35): one of them explicitly described non-specific neck pain excluding whiplash associated disorders (28). Four additional recent RCT's describe neck muscle training (40-43). For stretching and strengthening programs focusing on the cervical or cervical and shoulder/thoracic region, there is moderate evidence of short- and long-term benefit on pain and function in chronic mechanical neck disorders (34, 35). Strengthening and stretching of only the shoulder region plus general condition did not alter pain in the short or long term, but did assist in improving function in the short term for chronic mechanical disorders (35). In a study of females with chronic neck pain both endurance exercises and strength training decreased 12-month pain and disability outcomes more than did an exercise advice control group (28, 41). There is strong evidence of benefit for pain and function favoring a multimodal care approach of exercises (supervised) combined with mobilizations or manipulations for sub-acute and chronic mechanical neck disorders in the short and long term (28, 34).

c) Electrotherapy and other physical medicine modalities

Electrotherapy modalities include galvanic or diadynamic currents, iontophoresis, transcutaneous electrical nerve stimulation (TENS), electrical muscle stimulation, pulsed electromagnetic field (PEMF), repetitive magnetic stimulation or permanent magnets. However, electro-acupuncture is not included here. Other physical modalities included in this review are low-level laser therapy (LLLT),other types of laser therapy, ultrasound and thermal agents (e.g. hot packs).

Key messages regarding treatment with physical medicine modalities

- Conclusions on physical medicine modalities are difficult given the range of interventions and the limited and conflicting evidence.
- For electrotherapy, there is inconsistent evidence that transcutaneous electrical nerve stimulation (TENS) would be beneficial in the treatment of chronic neck pain. For electrical muscle stimulation or other electrotherapies such as galvanic current, diadynamic currents or iontophoresis, there is limited evidence of no benefit on pain at short term.
- For electromagnetic therapy (pulsed electromagnetic field therapy (PEMF), repetitive magnetic stimulation) limited evidence is found for beneficial effects. Repetitive magnetic stimulation is beneficial for pain and function in the short term in chronic neck pain; for PEMF this is true for pain immediately post treatment in acute and chronic neck pain.
- Limited evidence supports the benefit of low-level laser therapy (LLLT) with infrared wavelengths. LLLT appears to relief pain and have positive functional changes for acute and chronic neck pain in the short term. For other types of laser therapy no benefit was found for pain treatment in patients with neck pain.
- There is limited evidence of no benefit for thermal and ultrasonic agents in the treatment of non-specific neck pain.

Five systematic reviews studied the effect of physical medicine modalities as treatment for mechanical neck disorders (28, 33, 35, 44, 45). Notwithstanding the heterogeneity of the studies identified in the review of Chow, low-level laser therapy (LLLT) with infrared wavelengths has some limited evidence for the treatment of acute and chronic neck pain (45). The reduction in pain level with LLLT was modest

in patients with chronic neck pain and although limited by short term follow-up, findings were supported by positive functional changes (35, 45). Hurwitz concluded that LLLT is more effective than no treatment to improve acute pain and short term function in persons with sub-acute or chronic neck pain (28).

Five systematic reviews (21, 27, 28, 34, 35) analyzed the effects of a multimodal treatment for mechanical neck disorders. Multimodal approaches including stretching/strengthening exercise and mobilization/manipulation for subacute/chronic mechanical neck disorders reduced pain, improved function and resulted in favorable general perceived effect in the long term (35).

- There is strong evidence of benefit favoring a multimodal care approach of exercise (supervised) combined with mobilizations or manipulations for subacute and chronic mechanical neck disorders (27, 28, 34, 35).
- There is moderate evidence that manipulation and/or mobilization in combination with electrotherapy or medication or other non invasive techniques have shown no difference in benefit for pain relief, improvement in function and global perceived effect (21).

d) Multidisciplinary treatments

Multidisciplinary approaches, methods or treatments require a team of therapists from different disciplines working on the same patient together or alone without a common discussed purpose (46). The main difference between multimodal and multidisciplinary is the involved therapists. One therapist can give a multimodal therapy, but one therapist cannot give a multidisciplinary treatment.

Key message regarding multidisciplinary treatments

- There is little evidence found to support multidisciplinary approaches. This conclusion is to be considered carefully because little research of good quality has been performed to measure the effect of multidisciplinary approaches for patient with non-specific neck pain.

A rehabilitation program in a Cochrane review updated in 2008 was considered multidisciplinary if it encompassed a physician's consultation with either a psychological, social or vocational intervention, or a combination of these last interventions (47). It could not be shown by the two included studies (of low quality) that multidisciplinary rehabilitation was better than usual care for neck and shoulder pain (47).

One of these two studies was also included by Hurwitz (2008). Patients with neck pain who took part in a multidisciplinary rehabilitation program had comparable sick-leave outcomes compared to patients who received other care. But patients in this program experienced improved mobility over two years whereas those receiving other care did not (28).

e) Medication

Medication for the treatment of non-specific neck pain can be delivered by oral, intravenous, intramuscular, intra-articular, sub-cutaneous or intrathecal routes and classed as analgesics, anaesthetics, non-steroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, opioids, corticosteroids or Botulinum toxin (48).

Key messages regarding medication

- There are not enough studies on any medicinal treatment for non-specific neck pain to allow strong recommendation for treatment regarding medication. Therefore all the following key messages should be completed with key messages on pain therapy as found in general guidelines (American Geriatrics Society).
- Local anaesthetic injection with lidocain into myofascial trigger points appears beneficial for chronic non-specific neck pain, but it is no more effective than other less invasive techniques such as ultrasound or laser.
- There is moderate evidence for the benefits of non-narcotic analgesics including NSAIDs, because of their effectiveness on pain compared to placebo but unclear benefits compared to other treatments.
- Other treatments such as Botulinum toxin A injections or subcutaneous carbon dioxide insufflations have no better effect than placebo and so have no indication for non-specific neck pain.
- There is unclear evidence about the benefit of psychotropic agents used as muscle relaxants.

Local anaesthetics (lidocaine injections into myofascial trigger points) appear effective in reducing chronic neck pain when compared to dry needling or treatment as usual (stretching, exercises etc.) (48). However, it is no more effective than other less invasive treatments such as laser and ultrasound (49). In subacute and chronic neck disorders, there is unclear evidence of benefit for oral non-narcotic analgesics including anti-inflammatory agents (NSAIDs) (48): NSAIDS (such as ibuprofen, oxicams) combined with education or manipulation show no significant differences on pain compared with manipulation/physical therapy (48). Placebo controlled studies (moderate or low quality) show benefits of paracetamol, (opioid) analgesics or NSAIDs on pain. However, there is no clear difference when analgesics and/or NSAIDs are compared with each other.

f) Other methods

Other methods involve giving advice, education programs, using special pillows, collars and acupuncture as treatment.

At this time, there is no acceptable clinical evidence supporting surgical procedures such as anterior or posterior cervical fusion or cervical arthroplasty for neck pain with common degenerative changes only, when there is no radiculopathy, demonstrable instability or serious deformity.

Education programs and giving advice are methods which intend to influence the learning experience (49), illness beliefs and behavior of the patient with non-specific neck pain. Various educational programs were studied. They were delivered to the patients orally, under a written or audiovisual form (28, 35, 49). There is evidence of no short- or long-term benefit for pain or function with educational programs focusing on activation or on stress coping skills when compared to no treatment or other treatments (manual therapy, behavioral cognitive skills, massage, etc). For traditional neck schools also no benefit was found, when compared to no treatment (28, 35, 49). For specific groups, such as (female) computer workers, there is moderate evidence for the effectiveness of education or counseling programmes. After ergonomic counseling alone or combined with ambulant myofeedback in female computer workers, pain intensity and disability significantly decreased on short and medium term (50). A group-based work style intervention in a similar group of patients, resulted in a different work style behavior such as a more frequent use of breaks (51).

Only one systematic review is found on the topic pillows (52) and one other systematic review mentions pillows within various techniques (35). One RCT studied the effect of sleeping neck support combined or not with exercise (53). The combination of exercise with a neck pillow showed a significant effect. Although some studies showed positive effects on pain reduction, there is not enough evidence for the use of pillows alone to reduce chronic neck pain.

From one systematic review there is moderate evidence of no benefit for the use soft collars for patient with non-specific neck pain (35). One systematic review studied the effect of oral splints and found moderate evidence of no benefit (35).

There is strong to moderate evidence that acupuncture is effective for pain relief compared to inactive treatments either immediately posttreatment or in short- and intermediate follow-up for chronic mechanical neck disorders (35, 54, 55). A recent cost-effectiveness study among 3451 patients with chronic neck pain showed that treating patients with acupuncture resulted in a marked clinical relevant benefit and was relatively cost-effective in Japan, Spain and Germany. There is heterogeneity in acupuncture interventions (trigger point acupuncture, classical, and others). Trigger point acupuncture seems more effective than some other types of acupuncture for pain relief, measured at the end of the treatment and at short-term follow-up (56).

CONCLUSION

All conclusions should be applied with caution due to the actual weaknesses of most studies and should be applied as a guide to clinical decision making.

First of all, the concept “non-specific neck pain” has been described by several authors but it is a rather broad and vague concept. Also the concept of “diagnosis” in non-specific neck pain is a contradiction as it is based upon the definitions found in the literature: it is a concept which confirms that no identification of cause can be made to explain the “neck pain”.

It is possible that an identification of subgroups in the group of nonspecific neck pain patients might result in more targeted diagnostic procedures and treatments with a better response rate. Unfortunately, the available literature does not allow any further precision over those possible subgroups, so further research on subgroups can give more clarity.

It is important to emphasize the heterogeneity and lack of definition of many interventions described in the literature. Many studies lacked a definition of non-specific neck pain and did not describe the treatment modalities in detail.

Only the multimodal approach of manual therapy and exercises was found to be clearly effective. One could hypothesize that subgroups within the group of non-specific neck pain patients do exist, and that by combining several therapeutic approaches each of which is indicated for a specific subgroup, results are positive for the whole group.

Only limited evidence exists on pharmaceutical therapy for non-specific neck pain. These limited results are due to our methodology focusing only on non-specific neck pain, and so excluding all trials and (systematic) reviews on pain treatment for musculoskeletal disorders. So the conclusions of this report need to be completed with other evidence or guidelines on pain management.

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