

©Borgis

*Anna M. Lotowska-Cwiklewska¹, Piotr Jakubow², Urszula Kosciuczuk^{1,2}

Behavioral aspect of pain in laryngological (ENT) patients

Behawioralne aspekty bólu u pacjentów laryngologicznych

¹Department of Anaesthesiology and Intensive Care, Medical University of Białystok, Poland²Pain Treatment Clinic "Vitamed", Białystok, Poland

Keywords

post-operative pain, neuropathic pain, otolaryngology, pain management

Słowa kluczowe

ból pooperacyjny, ból neuropatyczny, otolaryngologia, leczenie bólu

Conflict of interest

Konflikt interesów

None

Brak konfliktu interesów

Address/adres:

*Anna M. Lotowska-Cwiklewska
 Department of Anaesthesiology
 and Intensive Care
 Medical University of Białystok
 24a Marii Skłodowskiej-Curie Str.,
 15-276 Białystok, Poland
 Phone: +48 (85) 7468302
 E-mail: anna.lotowska@umb.edu.pl

INTRODUCTION

Pain is the most common sign found in medicine forcing patients to seek medical help. It triggers a cascade of defence and adaptive reactions in the central and peripheral nervous system as well as in the endocrine system which in the net result will lead to repair and recovery of the damaged tissue. According to the definition presented by The International Association for the Study of Pain, pain is a subjective, unpleasant sensory and emotional experience arising because of the stimulus damaging the tissue or threatening to damage it. It's a serious health problem all over the world – provided that acute pain is usually a symptom

Summary

Issues related to the treatment of pain are increasingly the subject of interest to doctors of all specialties. In proper management of the patient with pain, it is extremely important to cooperate not only within the entire therapeutic team, but also directly with the patient. Knowledge of the pathomechanisms of the formation of particular types of pain, their intensity assessment, as well as the use of multimodal treatment is vital.

Acute pain is a particularly important issue that should be thoroughly investigated not only by pain specialists, but also by surgical specialty doctors. The correct analgesia allows not only to quickly control the pain, but also prevents its persistence.

Laryngological patients are a unique group of patients. In their case, it is important not only to effectively relieve pain, but also to prevent possible side effects of analgesics that could adversely affect breathing. Achieving this effect requires having the necessary knowledge about the pathomechanisms of pain formation and pharmacotherapy.

Streszczenie

Zagadnienia związane z leczeniem bólu coraz częściej stanowią przedmiot zainteresowania lekarzy wszystkich specjalności. W prawidłowym postępowaniu z pacjentem z bólem niezwykle istotna jest współpraca nie tylko w obrębie całego zespołu terapeutycznego, ale również bezpośrednio z chorym, a także znajomość patomechanizmów powstawania poszczególnych typów bólu, oceny ich natężenia, jak również stosowania leczenia multimodalnego.

Ból ostry stanowi szczególnie istotne zagadnienie, które powinno być dokładnie zgłębiane nie tylko przez specjalistów leczenia bólu, ale także lekarzy specjalności zabiegowych. Prawidłowe postępowanie przeciwbólowe umożliwia nie tylko szybkie opanowanie bólu, ale też zapobiega jego chroniczności.

Pacjenci laryngologiczni stanowią wyjątkową grupę chorych. W ich przypadku istotne jest nie tylko skuteczne uśmierzanie bólu, ale również zapobieganie ewentualnym działaniom niepożądanym leków przeciwbólowych, które mogłyby wpłynąć negatywnie na oddychanie. Osiągnięcie takiego efektu wymaga posiadania niezbędnej wiedzy na temat patomechanizmów powstawania bólu oraz farmakoterapii.

of an illness or tissue damage, chronic pain can be a separate disease entity on its own.

The process responsible for feeling pain is nociception which consists of 4 consecutive stages: transduction (transforming chemical, mechanical, thermal stimulus into electrical impulse), transmission (transmitting pain stimulus), modulation (stimulating, inhibiting or summing of stimuli occurring in spinal cord) and finally perception of pain experience in the central nervous system. Serotonergic and noradrenergic descending pathways which inhibit influx of impulses to spinothalamic tract (1, 2) have crucial meaning in the mechanism of the formation of pain.

Acute and chronic pain issues should be examined separately because of the different causes, mechanism of the formation and ways of treatment of these kinds of pain. The knowledge of these issues is crucial to successful treatment of pain. In the present dissertation we will discuss issues concerning acute pain that might happen to laryngological patients.

General rules of treating pain are described in WHO's pain ladder (fig. 1). It is necessary to pay special attention to the use of co-analgesics for example antiepileptic drugs, antidepressants, local anaesthetics and glucocorticosteroids in the case of neuropathic pain. Furthermore, it is recommended to use small doses of strong opioids rather than maximum doses of drugs from the second step of an analgesic ladder (3, 4).

		Step three
	Step two	severe pain (NRS 7-10) strong opioid
Step one	moderate pain (NRS 4-6) weak opioid	morphine oxycodone buprenorphine fentanyl etc.
mild pain (NRS 1-3) non-opioid	tramadol, codeine low-doses of strong opioids	
acetaminophen NSAIDs		
Adjuvants (e.g. antiepileptic drugs, tricyclic antidepressants, SNRIs, local anaesthetics, glucocorticosteroids etc.)		

Fig. 1. WHO analgesic ladder

Acute pain is often a nociceptive pain. It lasts no longer than 3 months. It's relatively easy to treat and by providing an effective therapy it subsides after a few or several days. Acute pain might develop either as a consequence of irritation of nociceptors (physiological pain) or because of the change in their properties (inflammatory and neuropathic pain). Physiological pain, when speaking about laryngological patients, is a pain associated with injuries and postoperative pain. Inflammatory pain is adaptive – it is formed due to tissue damage and subsequent inflammation (for example acute otitis media) but eventually it is supposed to lead to repair and regeneration.

Neuropathic pain is caused by direct damage of the somatosensory system structures, it is characterized by significant intensity, it is resistant to "normal" analgesic and is not adaptive (for example glossopharyngeal neuropathy). It is formed in the case of insufficient or improper treatment of acute pain.

REVIEW

Evaluation of pain intensity

Pain is a subjective symptom. It means that the same pain stimulus can trigger a pain of varied intensity depending on different people. We use the scale of pain evaluation to assess pain intensity (5, 6).

The most used in clinical practice and at the same time easy to use at the doctor's is NRS (Numerical Rating Scale). It's really sensitive and is characterised by strong repeatability of the results, that is why it is suitable for evaluation of acute pain as well as chronic pain, also as a way of monitoring effects of the treatment. It is used for the patients over 9 years old. The patient determines the intensity of felt pain using eleven – degree scale with 0 meaning no pain and 10 – the strongest imaginable pain. Analgesic treatment is adjusted accordingly to that number.

Another easy to use and often chosen is VAS (Visual Analogue Scale). To evaluate pain while using this scale a 10 cm ruler is needed, on which a patient points the intensity of the felt pain using the same rules as with NRS. Modified VAS assumes that the ruler used in the evaluation, has faces drawn on the far points of the scale – a happy face drawn next to the lack of pain end of the scale and a distorted face next to the point of the scale meaning the strongest felt pain. Unfortunately, this kind of scale is unintelligible and overly complicated for 10-25% of the patients.

The scale that enables descriptive evaluation of pain is VRS (Verbal Rating Scale) and the most commonly used one is a five-level Likert scale. The patient picks with its help the description of the pain intensity with the assigned number (1-5) that matches the symptoms felt by the mentioned patient. This type of scale is quite hard to use by the patients because of the ambiguity of pain intensity terms and because patients avoid inputting extreme values of the scale.

In children's case it is necessary to use scales adapted to the age of the patient. Children over 3 years old can be successfully evaluated by using picture scales for example FPS (Faces Pain Scale for example Wong-Baker scale, Oucher scale) and FSM (Finger Span Measure), in which a child evaluates the intensity of pain by a distance between the index finger and the thumb – linked fingers mean lack of pain, parted fingers – the strongest imaginable pain for the child (7). If the patient is a child less than 3 years old, the most successful scales are behavioural ones (based on the evaluation of the facial expression, lower limbs arrangement, crying, possibility of consolation and general activity) and MIPS/NIPS (Modified Infant Pain Scale/Neonatal Infant Pain Scale).

Neuropathic pain, which is a particular kind of pain not only because of the different type of treatment, but also because of the distinctive mechanism of formation and accompanying symptoms, is evaluated with the use of separate scales and forms. The most common being DN4 (Douleur Neuropathique en 4 Questions),

NPQ (Neuropathic Pain Questionnaire) and PainDetect Questionnaire Self-assessment Questionnaire (8). In the neuropathic pain evaluation, except for the intensity evaluation scales, equally relevant to a correct diagnosis is a physical examination verifying the extent of pain as well as negative symptoms (hypoesthesia, hypoalgesia) and positive symptoms (paresthesia).

Inflammatory pain

Typical inflammatory pain is a pain occurring alongside diseases like sinusitis or acute otitis media. It is formed as a result of tissue damage caused by inflammation and as a result – following changes in receptor properties. In the case of acute otitis media as well as in the case of sinusitis, the big importance of symptomatic treatment – both analgesic and antifebrile – is emphasized. Paracetamol and ibuprofen (especially effective is ibuprofen because of the anti-inflammatory component) are recommended drugs for the weak and medium intensity pain, as for the pain of stronger intensity during AOM, it is recommended to use paracetamol/ibuprofen combined with tramadol or codeine (9).

Posttraumatic pain

Posttraumatic and post-operative pains have similar characteristics and the mechanism of formation because they appear as a reaction to tissue damage through the external factor. They are typical pains of acute character, however treated incorrectly may maintain long after the end of the recuperation time as persistent pain.

In the case of laryngological patients posttraumatic pain is usually connected with the damage of the eardrum as well as injury of facial skeleton including nose and larynx.

The ear drum perforation is usually caused by a foreign object inserted (deliberately or not) in an auditory canal (10). Injuries like those ones are especially common among paediatric patients. The spectrum of symptoms includes pain and bloody leakage out of an auditory canal as well as dysacusia. If a foreign body was the cause of the ear drum perforation, it has to be removed. In all cases of the ear drum rupture it is necessary to use drops with glucocorticosteroid and an antibiotic to avoid the development of inflammation. An additional analgesic treatment is usually unnecessary, but if the patient reports the pain in this spectrum, paracetamol or medicine of NSAIDs group can be used.

A facial skeleton injury triggers typical receptor pain, however with a different intensity depending on the extent and placement of the injury. Also an analgesic treatment should be adapted to the patient's needs. We mainly use fast-acting preparations in an intravenous form, according to several steps of an analgesic ladder.

Post-operative pain

It's a pain that demonstrates a receptor component (because of the direct tissue damage) and an

inflammatory component (surgical injury triggers the release of inflammation mediators from damaged tissue which enhances hyperalgesia in that area and in surrounding them tissue).

Not relieved post-operative pain might be the cause of increased risk of cardiopulmonary complications, hampered ambulation (and as a consequence heightened risk of thromboembolic complications), increased nausea and vomitus, sleep disorders as well as development of post-operative persistent pain. One of the hardest to control type of post-operative pain, accompanying surgical procedures, is pain after tonsillectomy (11) and poor control of post-operative pain is the most common during the first day after the operative procedure (12).

A patient should be informed about the pain evaluation and pain relieving methods, what's more, analgesic treatment should be conducted according to current knowledge. It is unadvisable to use analgesics during the post-operative period "as the need arises" – it leads to the formation of breaks in analgesia, through which it is harder to control ensuing pain and at the same time the risk of pain chronification increases. We administer analgesics orally or intravenously in equal intervals because of pharmacokinetics of the given drugs, modifying them as the need arises. During the post-operative period we avoid administering the drugs intramuscularly or subcutaneously for it creates unnecessary discomfort, moreover, possible peripheral blood flow dysfunction caused for example by hypothermia, may disturb the absorption of drugs administered this way.

Selection of the right analgesic depends on the extent and placement of the operative injury. Especially strong intensity of post-operative pain is found in reconstructive surgery for example after facial skeleton injury or in surgical oncology. Foundation of successful post-operative pain treatment is evaluation of its intensity examined several times within 24 hours, and NRS and VAS scales are usually used for it. Measurement of pain intensity with the use of these scales is easy and effective, it's also characterised by strong repeatability of the results; that's why it's suitable for monitoring effects of analgesic treatment. In the case of patients with whom communication is impossible or really difficult to achieve (for example patients with cognitive disorder, dementia), behavioural scales of pain evaluation can be used. The most commonly used are DOLOPLUS-2 (consists of observation of patient's behaviour and reaction during 10 situations that may potentially cause pain and evaluation of pain intensity in 3 different aspects, varying from 0-3; this scale shows strong sensitivity as well as strong convergence with VAS) (13) and CNPI (Checklist of Non-Verbal Pain Indicators; it consists of observation of patient's behaviour such as wince, rubbing the painful area or verbal signals during movement and while resting). In the case of unconscious or

heavily sedated patients, the most common used scale to evaluate pain is BPS (Behavioural Pain Scale) where 3 parameters are examined – facial expression, upper limbs arrangement and reaction to mechanical ventilation, each on a scale of 1 to 4 points (14).

A specific category of patients are patients undergoing uvulopalatopharyngoplasty. Due to the extent of the operative procedure they need an effective analgesic treatment. Using opioids isn't advised because of the possible respiratory depression. It was proved that the usage of morphine for patients in the post-operative treatment that underwent uvulopalatopharyngoplasty is significantly connected with the prevalence of apnoea episode (15). Successful control of post-operative pain can be achieved with the help of NSAIDs, for example mefenamic acid administered orally combined with local techniques of relieving pain – injecting the peritonsillar area, uvula and soft palate with the use of 10 ml 0.25% solution of bupivacaine hydrochloride combined with 5 µg of adrenaline (16).

Recent guidelines on dealing with post-operative pain put big emphasis on individual approach of intraoperative analgesia in the case of different patients and usage of multimodal therapy that is involving administration of drugs affecting various receptors and/or local anesthesia techniques. In the case of tonsillectomy above-mentioned guidelines suggest usage of analgesia in advance in the shape of orally administered NSAIDs combined with orally administered gabapentin and intravenously administered dexamethasone as well as usage of local techniques of relieving pain in the shape of injecting peritonsillar area with 0.25-0.375% solution of bupivacaine or 0.5% solution of ropivacaine (5-7 ml on each side). In the case of post-operative analgesia it is recommended to combine paracetamol and/or metamizole with NSAIDs and weak opioids (tramadol). In the case of tonsillectomy usage of strong opioids such as morphine or oxycodone are recommended only as life-saving analgesia (3).

Neuropathic pain

Neuropathic pain is connected with direct damage of somatosensory system and forms when acute pain is treated incorrectly or insufficiently. It's strong or very strong kind of pain appearing suddenly, as a piercing pain. It is often accompanied by positive symptoms such as paresthesia. It might be caused by irritation of trigger points in the region of innervation of the occupied nerve/nerves or occur by itself. Neuralgia of cranial nerves occur particularly often among patients with multiple sclerosis.

The most common neuralgia occurring in facial skeleton area is trigeminal nerve neuralgia. Sickness rate amounts to 2-5/100k cases, women suffer from it more often. Symptoms consist of sudden, electrical paroxysmal pain or twinge that might last

a few seconds up to 2 minutes; it is typical to cause spasms of pain through non-painful stimuli irritating the trigger points (17).

Other kind of neuralgia that appears in tongue, oral cavity and throat area is glossopharyngeal neuralgia. It occurs less often than trigeminal nerve neuralgia. Its prevalence is often connected to posterior cranial fossa, nasopharynx, tongue area tumours, Paget's disease and multiple sclerosis as well as (in secondary glossopharyngeal neuralgia) peritonsillar abscess, petrositis, shingles, neck injuries and scars from ionising radiation or left after operative procedure. Its aetiology consists of neurovascular conflict which is formed because of direct pressure on the nerve or its nutritious nerves (peripheral mechanism) or peripheral and central sensitization caused by over excitability of cuneate and ventral posterolateral nucleus (central mechanism). Pain is similar to trigeminal nerve neuralgia and appears in palatine tonsil area, larynx, back of the tongue, nasopharynx in the angle of mandible and in the conch. Pain attacks might be accompanied by general symptoms such as bradycardia and even fainting (18).

In the case of neuropathic pain treatment of the first section consists of using 3 main groups of drugs: tricyclic antidepressants (mainly amitriptyline), serotonin reuptake and serotonin-norepinephrine reuptake inhibitors (SNRIs) – for example duloxetine – and anticonvulsant drugs being gamma-aminobutyric acid analogues (GABA) – gabapentin and pregabalin. In trigeminal nerve neuralgia carbamazepine is especially effective. Treatment of the second section might consist of using tramadol as a form of weak opioid that shows functioning of SNRIs. Moreover, in the case of insufficient effectiveness of the treatment or the intolerance of oral preparations, co-analgesics are added to the therapy – when neuropathic pain is precisely located through transdermal forms of lignocaine and capsaicin. Treatment of the third section consists of using strong opioids. In the case of neuropathic pain in patients with multiple sclerosis cannabinoids are highly effective (19).

CONCLUSIONS

Pain is the most common symptom occurring in medicine that every doctor encounters, independently of the medical specialization. Evaluation of pain intensity is always a patient's subjective assessment but it should be based on available pain evaluation scales, suited to the type of pain and cognitive abilities of the patient. Successful analgesic treatment has to be adequate for the type, development and intensity of pain and also take into consideration the mechanism of the action as well as grasping points of different groups of analgesics and their side effects. Pain treatment has to be carried out in close cooperation not only with the whole therapeutic team, but also with the patients themselves.

BIBLIOGRAPHY

1. Dobrogowski J, Zajączkowska R, Dutka J et al.: Patofizjologia i klasyfikacja bólu. *Pol Prz Neuro* 2011; 7(1): 20-30.
2. Kocot-Kępska M, Przeklasa-Muszyńska A, Dobrogowski J: Rodzaje bólu. *Neurologia, znieczulenie regionalne i terapia bólu*. [W:] Andres J, Dobrogowski J (red.): *Neurologia, znieczulenie regionalne i terapia bólu*. Ośrodek Regionalny CEEA w Krakowie 2011: 239-253.
3. Ciałkowska-Rysz, A, Dzierżanowski T: Artykuły poglądowe i wytyczne. Podstawowe zasady farmakoterapii bólu u chorych na nowotwory i inne przewlekłe, postępujące, zagrażające życiu choroby. *Medycyna Paliatywna* 2014; 6(1): 1-6.
4. Leppert W: Progress in pharmacological pain treatment with opioid analgesics. *Współcz Onkol* 2009; 13(2): 66-73.
5. Kocot-Kępska M: Praktyka kliniczna – przewodnik leczenia bólu. Ból jest objawem subiektywnym – jak go oceniać? *Med Prakt* 2018; 4: 97-102.
6. Dobrogowski J, Przeklasa-Muszyńska A, Kołłątaj M: Kliniczna ocena chorego z bólem. [W:] Wordliczek J, Dobrogowski J (red.): *Leczenie bólu*. Wyd. Lek. PZWL, Warszawa 2017: 301-328.
7. Goodenough B, Piira T, von Baeyer CL et al.: Comparing six self-report measures of pain intensity in children. *The Suffering Child* 2005; 8: 1-25.
8. Mulvey MR, Bennett M, Liwowski I et al.: The role of screening tools in diagnosing neuropathic pain. *Pain Management* 2014; 4(3): 233-243.
9. Hryniewicz W, Albrechta P, Radzikowski A (red.): *Rekomendacje postępowania w pozaszpitalnych zakażeniach układu oddechowego*. Zalecenia Ministerstwa Zdrowia w ramach NPOA, Warszawa 2016.
10. Carniol ET, Bresler A, Shaigany K et al.: Traumatic Tympanic Membrane Perforations Diagnosed in Emergency Departments. *JAMA Otolaryngol Head Neck Surg* 2018; 144(2): 136-139.
11. Gerbershagen HJ, Aduckathil S, van Wijck AJM et al.: Pain Intensity on the First Day after Surgery: A Prospective Cohort Study Comparing 179 Surgical Procedures. *Anesthesiology* 2013; 118(4): 934-944.
12. Hinther A, Nakoneshny SC, Chandarana SP et al.: Efficacy of Postoperative Pain Management in Head and Neck Cancer Patients. *J Otolaryngol Head Neck Surg* 2018; 47: 29.
13. Zwakhalen SM, Hamers JP, Abu-Saad HH et al.: Pain in Elderly People with Severe Dementia: A Systematic Review of Behavioural Pain Assessment Tools. *BMC Geriatrics* 2006; 6: 3.
14. Ahlers S, van der Veen A, van Dijk M et al.: The use of the Behavioral Pain Scale to assess pain in conscious sedated patients. *Anesth Analg* 2010; 110(1): 127-133.
15. Blake DW, Yew CY, Donnan GB et al.: Postoperative analgesia and respiratory events in patients with symptoms of obstructive sleep apnoea. *Anaesth Intensive Care* 2009; 37: 720-725.
16. Lee LA, Wang PC, Chen NH et al.: Alleviation of wound pain after surgeries for obstructive sleep apnea. *Laryngoscope* 2007; 117: 1689-1694.
17. Haytoğlu S, Arikan O, Muluk N et al.: Relief of Pain at Rest and During Swallowing After Modified Cautery-Assisted Uvulopalatopharyngoplasty: Bupivacaine Versus Lidocaine. *J Craniofac Surg* 2015; 26(3): 216-223.
18. Misiołek, H, Zajączkowska R, Daszkiewicz A et al.: *Postępowanie w bólu pooperacyjnym 2018 – stanowisko Sekcji Znieczulenia Regionalnego i Terapii Bólu Polskiego Towarzystwa Anestezjologii i Intensywnej Terapii, Polskiego Towarzystwa Znieczulenia Regionalnego i Leczenia Bólu, Polskiego Towarzystwa Badania Bólu oraz Konsultanta Krajowego w dziedzinie anestezjologii i intensywnej terapii*. *Anestezjologia Intensywna Terapia* 2018; 50: 173-199.
19. Stępień A: Neuralgie i nerwobóle twarzy. *Pol Przegl Neuro* 2007; 3(4): 262-271.

received/otrzymano: 12.07.2018
 accepted/zaakceptowano: 02.08.2018