Findings on Chronic Pain Management

Nobuyuki Otsuka

Hotal Ancient Medicine Research Institute (HARI)
3-2-1 Hotarugaike-nakamachi, Toyonaka, Osaka, 560-0033 Japan
E-mail: nj00ot@kmj.biglobe.ne.jp

Keywords: chronic pain, nociceptive pain, neuropathic pain, antidepressants, acupuncture and moxibustion treatment, autonomic nerve

Patients of nociceptive pain as well as chronic pain due to neuropathic pain and psychogenic pain are increasing. In particular, pain generated after surgery involves tension and emotion of the sympathetic nerve, so it is difficult to control with drugs. In this paper, I will report on chronic pain that acupuncture and moxibustion treatment is thought to be effective.

In ancient era, people made a physiological interpretation that pain would lead to the brain through nerves, and sensed the pain as a sensation. Currently it is not only a simple pain but also an unpleasant sensation such as bitterness and an emotional experience [1, 2]. Pain is classified by source. Pain due to nociceptive pain (somatic pain, visceral pain), neuropathic pain (pain due to nerve injury, pain without nociceptive stimulus), psychogenic pain (unconscious psychological state such as anxiety or anger It causes pain) [3]. Recently, cases of complaining of chronic pain due to neuropathic pain, psychogenic pain and the like are increasing. Chronic pain is defined as pain associated with a progressive noncancerous disease with pain lasting longer than expected for treatment.

The boundary between acute pain and chronic pain is difficult to define. Acute pain is caused by nociceptor excitation. In the case of refractory in chronic pain, it is caused by a functional change in the central nervous system. The transition area during this period can not be defined. In this transition area, if the cause of pain is taken as the excitement of the nociceptor, it is important to determine the appropriateness of the intervention method or the therapeutic treatment method.

The definition of chronic pain is ambiguous. There are many cases of transition from acute pain. Neuropathy is not cured, harmful stimulus may be the cause of pain. When functional changes in the central nervous system occur, chronic pain will occur even in one month. Diagnosis of chronic pain becomes more difficult if multiple factors such as psychogenic and social factors are involved.

The pathogenesis of chronic pain is different between nociceptive pain and neuropathic pain [4, 5]. In the case of nociceptive pain it is inflammatory pain through nociceptors. Inflammation caused by tissue injury releases painful substances, resulting in continuous spon-

taneous pain. In addition, sensitization of nociceptors results in hyperalgesia (allodynia).

The mechanism of nociceptor sensitization is the phosphorylation of TRPV 1 (Transient Receptor Potential Vanilloid 1) channel, which is a noxious stimulatory receptor of the ion channel. In the case of neuropathic pain, there was previously a germination theory of Aβ nerve fibers from the dorsal horn of the spinal cord. In recent years, gene expression in dorsal root ganglion cells due to input increase from primary afferent nerve accompanying nerve injury, phosphorylation of synapse ion channel type glutamate receptor NMDA (N-methyl -D-aspartic Acid) receptor. Activation of microglia in the dorsal horn of the spinal cord, and other functional changes have been revealed. Based on the above-mentioned new knowledge about pain, it is necessary to consider the analgesic effect by acupuncture and moxibustion therapy.

Pain is an unpleasant sensory emotional experience associated with substantial or potential injury of the tissue. Recently, knowledge on emotional experiences and so on has increased, and approaches to pain based on sensory emotional experiences have been made. Pain is caused by free nerve endings and polymodal receptors. Polymodal receptors tend to cause pain because they respond to various stimuli. In addition to TRP (Transient Receptor Potential) channels, polymodal receptors that respond to BK (Bradykinin), PG (Prostaglandin), and Cytokine are B2/B1 and EP/IP. On the other hand, there is a problem that people who are injured in TrkA receptors reacting to NGF (Nerve Growth Factor) do not feel pain [6].

After surgery, pain may continue for a long time after surgery. Since there is a possibility of thrombus formation as a cause of pain, perioperative anticoagulation therapy is administered after surgery to administer anticoagulant. In the management of acute pain, self-adjusted analgesia method PCA (Patient Controlled Analgesia) was the first choice until now. However, as the adverse event in the nerve block, there were the most reports and it was a problem [6]. A method to solve the problem of PCA is epidural self-regulating analgesia method PCEA (Patient Controlled Epidural Analgesia). PCEA is to administer a prescribed amount of an analgesic in small increments to the epidural space by pressing a switch by a patient. In the past, PCEA was the first choice after surgery, but recently PCA administered IVPCA (Intravenous Patient Controlled Analgesia) under systemic administration of opioids is implemented. The patient presses the button when he felt it hurts. Devices were developed to automatically inject opioids when buttons are pressed.
The problem is expensive. PCEA is good in cases of pain during body movements or early postoperative days, but IVPCA is the first choice because IVPCA also has the same effect as PCEA for resting pain.

It has recently been found that neuropathic pain is involved in chronic pain patients with nociceptive pain. Recently, the mechanism by which inflammation changes into neuropathic pain has been revealed. When the inflammation prevails and a sustained pain signal is input to the

nerve, the nervous system acquires hypersensitivity as an error. Acquiring hypersensitivity means to create a situation that is easy to recognize as pain. Chronic pain caused after persistence of inflammatory pain is thought to be accompanied by neuropathic pain. Therefore, a treatment requiring both nociceptive pain and neuropathic pain is needed. Since non-steroidal anti-inflammatory drugs NSAIDs have no effect in the treatment of neuropathic pain, new drugs have been developed. In the United States, pregabalin was clinically adapted from 10 years ago, but in Japan it was adapted from five years ago (trade name Lyrica). Pregabalin suppresses pain by inhibiting the transmission of pain [7].

The mechanism of action of pregabalin is as follows. Normally, information is transmitted from the peripheral nerve terminal to the dorsal horn nerve of the spinal cord. Extracellular Ca ions from calcium channels are taken up into nerve cells at nerve endings. Neurotransmitter vesicles containing glutamate are released into the receptors to convey information of pain. In the case of neuropathic pain, Ca ions enter the nerve cell by channel opening even with slight pain information from the periphery. Therefore, a large amount of neurotransmitter is released, the signal is amplified, and information is transmitted as strong pain. Pregabalin adheres to the Ca channel and suppresses the opening of the Ca channel. Therefore, even when information is transmitted, neurotransmitters are not released because Ca is not taken into nerve cells. Pregabalin was originally used as an antispasmodic agent, but it was found to have efficacy in the dorsal horn of the spinal cord, and it began to be used. Side effects include drowsiness and declining concentration, and wandering in the elderly. Many of the neuropathic pain is intractable in nature, so even with pregabalin pain can not be completely taken. Therefore, it is important to improve quality of life (QOL) and basic activities necessary for normal daily life ADL (activities of daily living) rather than completely eliminating the pain.

Evaluation methods include the following. As evaluation of pain itself, there are VAS (visual analog scale), NRS (Numerical Rating Scale), Face scale, McGill Pain Questionnaire, Neuropathic Pain Screening Questionnaire. In the activity evaluation, there are BPI (Brief Pain Inventory), PDAS (Pain Disability Assessment Scale), and RDQ (Roland-Morris Disability Questionnaire). In psychological evaluation, there are PCS (Pain Catastrophizing Scale), HADS (Hospital Anxiety and Depression Scale), BDI (Beck Depression Inventory), POMS (Profile of Mood States), STAI (State Trait Anxiety Inventory).

I will discuss and conclude chronic pain from the above results. Chronic pain is thought to have complications caused not only by neuropathic pain, but also by decreasing dopamine and decreasing activity in the cerebral nucleus accumbens region in the descending control system. In addition, pain management issues such as the risk of epidural block are raised. In particular, since pain is involved in tension and emotion of the sympathetic nerve, it is difficult to control with drugs. New knowledge has been proposed against the conventional idea centered on inflammation, and limitations and problems of cur-

rent Western medicine treatment have been clarified.

Regarding drug treatment, block injections are carried out for neuralgia such as shingles (herpes). For intercostal nerve block, pregabalin is used. Because pregabalin is a drinking medicine, it is prescribed in various cases to block pain in various parts. The accumulation of evidence on the synergistic effect of pregabalin and acupuncture and moxibustion treatment is important.

Psychological factors include cognitive bias and psychosocial factors. There are psychosocial factors based on cognitive bias other than organic factors as reasons for pain chronicity. Therefore, it makes treatment difficult. Rather than aiming at eliminating pain, it is important to take a viewpoint other than pain from academic exercise treatment, such as becoming able to do something that could not be done, doing what you can not do.

There are increasing cases of complaining of not only nociceptive pain but also chronic pain due to neuropathic pain and psychogenic pain. In the case of neuropathic pain, gene expression in dorsal root ganglion cells due to increased input from primary afferent nerve associated with nerve injury has been revealed. Anti-inflammatory drugs are used as analgesics, but recently analgesic treatment using antiepileptic drugs and antidepressants has become important. Because patients with chronic pain of nociceptive pain contain neuropathic pain, pregabalin (Lyrica) is prescribed for inhibiting pain by inhibiting pain transmission. Based on this new finding concerning pain, it is important to accumulate the evidence of analgesic effect on these pain by acupuncture and moxibustion therapy.

[1] Kazuo Maruyama, The way of thinking of pain, Nankodo, 2014.

[2] Natsu Koyama, Basic knowledge of pain and analgesia, Gijutsu-Hyohron, 2010.

[3] Eiji Furuya, Toyo Therapy Association edited Textbook Acupuncture Theory

[4] Nobuo Nara, Toyo Therapy Association edited Textbook Clinical Medicine General Edition 2nd edition.

[5] Nobuo Nara, Toyo Therapy Association edited Textbook Clinical Medicine Detailed Exposition 2nd edition.

[6] Syuichi Nosaka, The Japan Society of Acupuncture and Moxibustion Kansai Branch Seminar A, Osaka, Sep. 2015.

[7] Yohji Fukazawa, The Japan Society of Acupuncture and Moxibustion Kansai Branch Seminar A, Osaka, Sep. 2015.

(Accepted 1 December 2015)

Dr. Nobuyuki Otsuka

He graduated from Tohoku University in 1985 and completed the first half term of doctoral course of Tohoku University graduate school in 1987. He was awarded doctor degree in 1997 from Tohoku University.

He established Hotal Ancient medicine Research Institute (HARI) in 1999. Now, he is enrolled at Meiji school of oriental medicine from 2014. He is engaged in research on oriental medicine such as traditional Chinese medicine, acupuncture and moxibustion, qigong etc.