

The Pain Clinic and Activities of Pain Management Today, in Japan

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Spinal Cord Stimulation(SCS) Treatment

Since the introduction of the Gate Control Theory by Melzack and Wall in 1965, Stimulation Produced Analgesia(SPA), which activates the pain self-control system of the body, has been widely popularized as one of the most effective methods of pain management.

Based on this idea, stimulation of the spinal dorsal column for pain control was introduced by Shealy in 1967, and transcutaneous electrical nerve stimulation(TENS) was introduced by Wall & Sweet in 1967.

In 1971, Professor Shimoji became the first person to report on the clinical applications of spinal cord stimulation(SCS) using an electrode placed in the epidural space. Following this work, SCS with transcutaneously inserted epidural electrodes has been adopted throughout the world.

Today in Japan, SCS treatment is being practiced in more than ten institutes, including our Pain Clinic.

Since the beginning of 1992, SCS treatment

has been adopted(accepted for coverage) by the National Insurance Health Service. It is certain that this treatment will become more widely used throughout Japan in the near future.

The advantage of SCS treatment are as follows:

- 1) Dramatic pain relief, particularly the pain which does not respond to other conventional treatment methods
- 2) Benefits are also seen in rehabilitative treatment by improving peripheral circulation, inhibiting involuntary movement and restoring unconsciousness
- 3) The technique is easy and safe with no serious complications
- 4) The electrode can be removed when necessary

The disadvantages of SCS treatment are the high cost of the device and the gradual decrease in effectiveness with long term use.

The best indication for SCS is pain. In particular, SCS is indicated for refractory type pain which does not respond to the usual conventional treatment methods, including nerve blocks. Namely, good subjects of SCS treatment include

back pain due to unsuccessful back surgery, causalgia and related sympathetically maintained pains.

According to Jamaer, SCS is indicated for various painful disease. These indications are derived from his extensive experience with over 130 cases.

It is also indicated for non-pain related diseases, namely: rectal and bladder disorders due to spinal cord injury or multiple sclerosis, involuntary movement due to cerebral paralysis or spastic torticollis, peripheral circulation disturbance due to ASO or Raynaud diseases, prolonged impairment of consciousness due to cerebral circulatory disturbance.

Case Presentation

1) A 55 year old male, causalgia

Past History: In October 1987, the patient underwent a cardiac catheterization under the diagnosis of angina pectoris. He experienced intolerable sharp pain in the elbow when an attempt was made to insert the catheter into his right brachial artery. Immediately after this, motor and sensory disturbance in the median nerve area of the upper right limb was noticed. Severe burning pain continued after wards. This pain could not be alleviated by medication or physical treatment. The patient was finally referred to our Pain Clinic, almost two years after the accident, because the pain was aggravated by his present illness. He could not move his right arm because of the severe pain and the skin on his arm looked edematous and pale. Prominent allodynia was also present. X-ray showed dystrophy of the radial and ulnar bones.

In our pain clinic, drastic nerve block treatments including repeated stellate ganglion block and continuous cervical epidural block were performed for more than six months. The

treatment results were unfortunately disappointing. Consequently SCS treatment was considered.

A set of SCS treatment apparatus is available today from the Medtronic Company.

Technique

The patient is asked to take a prone or lateral position. Local anesthesia is applied when the patient is in a conscious state. Epidural tap is performed under an image intensifier control.

An electrode is inserted one segment or two above the corresponding spinal segment on the affected side. The electrode is shifted and placed at the most appropriate site to evoke a tingling sensation in the most seriously affected area. The epidural electrode is left in place, and the patient is observed for one week to determine the effectiveness of electrical stimulation. If the stimulation has been effective, a receiver is implanted. Electrical stimulation is provided at anytime via an antennae which sends signals to a receiver implanted underneath the skin.

In this patient, the results of the SCS treatment were extremely dramatic. The pain subsided immediately and the patient was able to move the right arm freely.

During the patient's two year follow-up visit, there were no complaints except for shoulder stiffness which might have been caused by implantation of the cord. He is working daily, as he had before the pain started. The patient continued to perform electrical stimulation on himself for 15 to 30 minutes, twice daily.

2) A 64 year old female

Eleven years ago, this patient experienced bladder pain. A diagnosis of parenchmal cystitis was rendered. An external artificial bladder fistula was installed to relieve the pain which was aggravated by accumulation of urine in the

bladder. The tube could not be removed because of the pain, so she was referred to our Pain Clinic. Continuous epidural block treatment partially relieved her pain. Finally, epidural electrical spinal cord stimulation treatment was provided. An electrode was first inserted at the T-12 level, but the pain relief was insignificant. The electrode placement was then changed to the T-8 level which provided excellent relief of symptoms. Two weeks later, implantation of the electrode was performed, and discharged. This case demonstrates that SCS treatment is also useful for refractory visceral pain.

SCS treatment was provided for six unsuccessful back operation patients in our clinic. The results were all satisfactory except one which responded well to conventional continuous epidural treatment. It was confirmed that SCS treatment is an excellent indication for unsuccessful back operations.

Stimulation Produced Analgesia is not only effective for the skin surface and the spinal cord; the brain can also be stimulated with electricity. The closer the area to be stimulated is to the central nervous system, the stronger the analgesia that can be provided.

Nowadays, there are many reports available concerning deep brain stimulation treatment. Professor Hosobuchi of the San Francisco Medical Center is famous in this field. He has performed more than 200 cases of deep brain stimulation.

In Japan, Professor Tsubokawa of Nihon University has treated more than twenty cases with excellent results. The actual results of this treatment, however, are still under evaluation. There are not many institutes yet where this treatment is practiced in Japan.

Intravenous Regional Sympathectomy with Guanethidine(IRSG)

In 1974, Hannington-Kiff advocated a new sympathetic nerve block technique which has fewer side effect, simpler in technique and longer in action as compared to stellate ganglion block. This technique is called intravenous regional sympathectomy(IRS) and is very effective for RSD. In 1981, Erikson reported comparison effects between stellate ganglion block and IRS with guanethidine(IRSG). According to his report, the duration of the effect was 10 hours with SGB and 3 days with IRSG.

In Japan, IRSG treatment was introduced in 1982. However, intravenous guanethidine is not sold on the Japanese in market, and its importation is not easy. For this reason, intravenous reserpine which is an alternative of guanethidine has often been used in clinical practice. In our pain clinic, we have also treated 13 cases of causalgia, Raynaud's disease, and PHN by means of IRS with reserpine.

In a series of treatments we found that IRS was preferable for upper extremities as opposed to lower extremities, because lower extremities can be easily treated with a lumbar sympathetic ganglion block or a continuous lumbar epidural block.

Recently, it has become easier to obtain guanethidine from Chibagaigi company. Consequently, developments in IRSG use have become accelerated. The benefits of using guanethidine compared to reserpine are: first, reserpine travels through the blood-brain barrier, while guanethidine does not. This means that guanethidine does not act on the central nervous system, even if the concentration is high in the blood while reserpine has a central action. Secondly, guanethidine acts/moves rapidly and

its effect is stronger compared to reserpine.

We have treated 25 cases with IRSG: 18 cases of RSD, 5 cases of causalgia and 2 cases of shoulder-hand syndrome after cerebral bleeding. These are all categorized as sympathetically maintained pain.

In 18 cases of RSD, you will notice how far the pain scores in the VAS were reduced. The frequency of treatments ranged from 1 to 46 treatments, and the average number of treatments was 9. All but 4 cases showed remarkable improvement.

In 5 cases of causalgia, again, remarkable improvement was noticed. The average score of 7.4 was decreased to 1.2.

In 2 cases of shoulder-hand syndrome, symptoms were completely removed in both cases by the second and third treatments.

An IRSG was performed following Bier's technique for intravenous regional anesthesia, using a local anesthetic. An orthopedic tourniquet was applied to the dorsal part of the extremity. An indwelling cannula was then inserted into a vein of the limb to be injected. Exsanguination was performed by an Esmarch bandage, and then the tourniquet was inflated to a pressure of 200 mmHg in the upper limb, and to 300 mmHg in the lower limb. In the upper limb, 20 ml of 0.5% Mepivacaine containing 10 mg of Guanethidine and 100 units of Heparine was slowly injected, while the tourniquet was inflated. In the lower limb, 30 ml of a solution containing 15 mg of Guanethidine was used.

The tourniquet remained inflated and was released 20 minutes after the injection. The patients were allowed to return home after 1 hour of careful observations. In the series of treatments we performed on these patients, there was no occurrence of rapid drop in blood pressure, change of pulse rate, change in pulse rhythm or other remarkable complications ob-

served.

Peripheral Nerve Branch Block Treatment with Highly Concentrated Local Anesthetics for Primary Trigeminal Neuralgia

Primary trigeminal neuralgia is one of the most common diseases encountered in the Pain Clinic. The most reasonable and orthodox treatment is 1. oral carbamazepine administration 2. peripheral nerve branch block and 3. Gasserian ganglion block with alcohol or radio frequency ther-mo-coagulation and Jannetta's decompression operation.

Among these methods, peripheral nerve branch block and Gasserian ganglion block are mainly carried out by anesthesiologists in the Pain Clinic. With regard to the peripheral nerve block, a neurolytic agent such as pure alcohol has commonly been used because it is simple to use and provides excellent results.

On the other hand, there are various complications such as posttreatment edema, residual numbness in the blocked area, and necrosis of subcutaneous tissue(although this is rare) which have resulted from this treatment.

Moreover, the duration of effects from the peripheral nerve block are unpredictable. The effect may last three months or several years. This duration does not coincide with the duration of peripheral nerve recovery from alcohol destruction.

From this point of view, it can be said that we can achieve the same therapeutic objective, if the pain attack is inhibited until the next paroxysm. In this aspect, we have obtained satisfactory results for more than 10 years using high concentrations of local anesthetics instead of alcohol.

We recommend two anesthetics for this purpose: 0.5% bupivacaine(Marcaine) and 1% dibu-

caine.

The same technique and the same dose of drug are used when performing a nerve block with alcohol.

After inserting the block needle at the peripheral branch of the exact affected trigeminal nerve, a very small dose of local anesthetics such as 1% lidocaine is injected. Fifteen or twenty minutes after being assured that the block is effective, a 0.5 ml of a highly concentrated local anesthetic is injected.

A comparison of 0.5% Marcaine and 1% dibucaine, shows that the latter is stronger and provide effects of longer duration. Regarding

side effects, 1% dibucaine results in more complications such as edema and numbness of the injected area, although the side effects are not as severe as alcohol. It can therefore be said that 1% dibucaine ranks between 0.5% Marcaine and alcohol in nature.

This table 1 shows the results of pain alleviation in 20 cases after performing infraorbital nerve block treatment with 0.5% Marcaine. With a single treatment, satisfactory results, that is pain scores which decreased from 10 to less than 5 were obtained in 9 out of 20 cases(45%), With three treatments, the same results were obtained in 16 cases(80%). When

Table 1. Results of infraorbital block with 0.5 ml of 0.5% Marcaine

Initial pain score	After 1st treatment	2 nd	3 rd
10 →	5 →	1 →	—
10	0	—	—
10	2	—	—
10	10	10	3
10	10	10	alcohol
10	7	2	0
10	10	9	0
10	10	10	0
10	10	7	10
10	8	0	—
10	10	10	10
10	10	2	—
10	1	1	—
10	1	—	—
10	10	2	—
10	2	—	—
10	2	0	—
10	7	7	7
10	0	—	—
10	0	—	—
effective rate	45%	75%	80%

the treatment was repeated an additional 2 or 3 times, 18 of 20(90%) showed good results.

Regarding the mechanism of action, it is obvious that stimuli from the trigger zones were not created by nerve destruction with alcohol. During the use of an anesthetic, this mechanism does not apply. The mechanism can be explained as: pain is reduced by the inhibition of the nerve hypersensitivity, even if transient, thereby interrupting the vicious pain cycle and activating the body's self healing power. From this point of view, a high concentration of a local anesthetic is desirable because its action is more powerful.

0.5% Marcaine is available in the market, while 1% dibucaine must be specially ordered from a pharmaceutical company. For this reason, we usually use 0.5% Marcaine.

The advantages of a high concentration of a local anesthetic for the treatment of trigeminal neuralgia are listed as follows:

- 1) Excellent therapeutic results: as high as 80 % effectiveness is obtainable within three treatments with 0.5% Marcaine.
- 2) Side effects and complications are much less as compared to alcohol.
- 3) Repeated injection is possible when recurring pain occurs.

The shortcomings of a local anesthetic are that the effect is far inferior to alcohol. The dramatic relief of pain which is found after one injection with alcohol is not obtainable using a local anesthetic. Furthermore, the duration of the effect is shorter.

Even with these shortcomings, it has been concluded that peripheral nerve branch treatment should be performed with a high concentration of a local anesthetic at least 2 or 3 times prior to alcohol injection.

Treatment of Hemifacial Spasm with Botulinum Toxin

Although hemifacial spasm is not a painful disease, patients with this condition are frequently seen in the Pain Clinic because hemifacial spasm can be treated with a facial nerve block. Today, I would like to introduce a new (innovative) treatment that is now being practiced in Japan.

Botulinum toxin is a protein produced from clostridium botulinum, an anerobic Bacillaceae, of which there are seven subtypes: A to G. Type A is the most toxic, but it is the most stable and can be purified and crystalized. In the U.S.A., this botulinum toxin has already been used for the treatment of nystagmus, hemifacial and blepharo spasm, dystonia and spastic torticollis.

The mechanism of action is considered to be as follows: the botulinum toxin binds to the neuromuscular junction and blocks nerve transmission by inhibiting the release of acetylcholine from nerve endings.

In Japan, the production of this toxin commenced at Chiba Bacterial Research Institute in 1987. This toxin is now under research in several institutes for the treatment of various diseases. In our Pain Clinic, we have also treated 74 cases of hemifacial spasm using this toxin.

1) Treatment Technique

The injection sites are determined by the intensity of spasms in the face. Usually, they are confined to the upper and lower, and internal and external margin of the orbicular oculi and oris muscles.

A very small amount of toxin, 0.25~0.1 ml containing 50 units/ml, is injected into each of these sites, Usually 3 to 6 sites are injected during a treatment session. The solution is not an

irritant, so the patient does not feel pain on injection.

Treatment effects are usually felt from the second day after treatment and reach a maximum level within one week. Treatment effects are evaluated two weeks after the initial injection, and if necessary, a second injection is given.

2) Result

Excellent results were obtained in 57 out of 68 case(83.8%) within 3 treatments. Eighty-eight of the total patients expressed satisfaction with this treatment.

With regard to the side-effect, 13 cases of ptosis, 4 cases of difficulty of eye lid closure, and 11 cases of ptosis of oral margin were noticed. But since those side effects were very transient, other treatment were not necessary.

The short comings are that the duration of the effect is not prolonged or permanent. The average recurrence of the spasm occurred 3.6 ± 2.8 months after the treatment. Better results can be expected with a follow up second treatment.

As for the safety of the toxin, it is considered that systemic reaction and allergic reaction never occur, since the toxin binds to nerve cell alone and extremely small dose is used.

In conclusion, treatment of hemifacial spasm with botulinum toxin is effective and useful. The duration of the effect however is so short that, curative treatment, Jannetta's nerve decompression operation, is after all necessary for permanent relief. Botulinum toxin treatment is considered to be an effective supplementary treatment for this surgical operation.

Topics concerning Terminal Cancer Pain

I would like to talk about topics currently

being discussed and written about in Japan in terms of management of terminal cancer.

The WHO Cancer Pain Relief Programme is now popularly practiced in Japan, just as in other countries. The Three(Ladder) Step Program of : 1 aspirin, 2 codeine, and 3 morphine according to the intensity of pain experienced is widely adopted in Japan. In particular, morphine antagonists such as Pentazocine and Buprenorphine are used in Japan because Morphine comes under strict narcotic regulatory control.

The MS Contin tablet, a sustained-release morphine, has been available on the market since 1989. It has gained remarkable popularity within a short period of time.

Since the WHO Cancer Pain Relief Programme was developed, nerve block treatments, mainly practiced by anesthesiologists, have gradually decreased in number. Even so, the epidural block, the subarachnoid block and the celiac plexus block are still widely practiced when indicated.

Patient-controlled analgesia(PCA), using a specially programmed pump is becoming very popular.

Chemical neuroadenolysis had once gained great enthusiasm in Japan, as it had in other countries. The Gumma University and Doctor Yanagida of Tokyo Teishin Hospital are very famous in this field.

Dr. Yanagida, who performed chemical neuroadenolysis on more than 1,000 patients, clarified the action and mechanism of this treatment. Namely, there is a pain transmission route called the adeno-hypothalamic tract in the brain. This tract is activated by or blocked by electrical stimulation or alcohol injection, there by producing analgesia. In passing, when electrical stimulation is applied to the pituitary gland, analgesia of the whole body is elicited.

To interpret the analgesic mechanism of the body through chemical adenolysis is a fascinating subject. However, this treatment has not become popular for clinical practice because the technique is rather complicated.

Rather, I would like to emphasize the importance of using common somatic and sympathetic nerve blocks before using neurolytic agents for treatment of cancer pain. Cancer pain originates from various etiologies. There are many types of pain which can be sufficiently relieved by conventional nerve treatment.

Case Presentation:

A 65-year old male, medical doctor

He has been suffering from upper back pain due to lung cancer for more than 4 months. X-ray findings revealed a localized tumor in the right upper lung. A trigger point was found on the right side of his back. The usual Trigger Point Block was applied at this site with a local analgesic. Pain was controlled remarkably well after the third block. Three months later, he finally received a Subarachnoid Phenol Block at the T-7 level because he was experiencing intercostal neuralgia due to cancer infiltration. His back pain, however, was minimal until then because he had undergone the simple Trigger Point blocks.

Improvement of the Therapeutic Result for Post-herpetic Neuralgia

Post-herpetic neuralgia(PHN) is one of the most despondable and uncontrollable disease even for pain clinic(PC). The sharp or sometimes burning pain persists for years after the healing of skin eruptions.

The skin covered with scar is insensitive to the pin prick. Nevertheless, pain exists on the numb skin.

This type of pain is defined as a "deafferentation pain" which means that the pain is irrelevant to noxious stimulation.

Once PHN was established, complete cure is hardly expected. No perfect therapeutic method has ever been discovered.

The occurrence rate of PHN according to age was investigated in 1957 at Mayo Clinic in USA by analysing 916 herpes zoster(HZ) cases.

When PHN is defined as the pain which is still lasting even after 1 month from the onset of illness, the occurrence rate of PHN in 50 year olds is about 50%, in the sixty year olds 60%, and in the seventies about 70%.

The rate definitely increases respective to age.

Younger people under the age of 50 suffer much less than aged people.

In 1969, Dr. Colding and his colleagues, Danish doctors, reported that the early regional nerve block could prevent herpes zoster from developing into post-herpetic neuralgia(PHN).

Before this report, we have had a lot of experiences of treating herpes zoster and PHN with nerve block techniques. The results were satisfactory. Until now, we have treated more than 1200 cases in our clinic.

The prime purpose of nerve block is to block the sympathetic nerve innervating the affected area, thereby interrupting the reflex dystrophy mechanism.

In an acute stage, somatic nerve block is also recommended, particularly for pain alleviation.

So, both sympathetic and somatic nerve innervating identical area are usually blocked together. For instance, we provide supra-orbital n.block followed by stellate ganglion block for herpes zoster in the supra-orbital region.

Both cervical plexus block and SGB are performed for cervical HZ.

Epidural block is popularly applied for tho-

racic, abdominal and lumbar HZ. The intercostal nerve block is also often applied for thoracic HZ.

Regional infiltration block is also often applied when the painful region is restricted in a relatively small area. It is most important to start the nerve block treatment as early as possible. The earlier, the better.

Moreover, the more the block is repeated, the better results are obtained. Therefore, patients are requested to visit the PC twice or three times a week in an acute stage.

Patients with severe pain and prominent skin eruptions should be admitted to the hospital. Then drastic treatment such as continuous epidural block can be applied.

Steroid is often very effective. This is used in combination with local anesthetic drug. Steroid is particularly useful in acute stage, when inflammatory process is still existing. However, from our experiences steroid is also effective in later stage.

Very prominent differences of the results are seen like below, according to the duration of the illness.

In 131 cases whose treatment were initiated within one month, the results were exceedingly good. Excellent and good results were obtained in 96% of the patients. Development to PHN was noted only in 2 cases out of 131.

Even if the start of the nerve block treatment is commenced later than one month of the onset of the disease, similar satisfactory results were obtained in 85 cases having less than 3 months' history of the illness.

However, in cases whose treatments were delayed more than 3 months after the occurrence of the illness, the results became worse. Excellent and good results were obtained in less than 50%. Particularly, in the cases of more than one year duration, therapeutic results were very

disappointing. Poor cases which did not respond to the treatment were recorded in more than 50% of the patients. We can thus conclude that herpes zoster in aged people should be treated with nerve block as early as possible, within 3 months after the occurrence. In order to minimize, the development to PHN is least likely to occur.

Then we must address the situation with these patients who are treatable with nerve block. We are concentrating efforts to find effective measures for the improvement of the symptoms, if not complete cure. The following treatments are examples of such efforts.

Cryoanalgesia

Cryoanalgesia therapy which makes use of liquid nitrogen vapor is sometimes effective for refractory PHN cases. Skin surface temperature is cooled down to 10°C. This therapy was originally used for joint pain.

TENS

This electric appliance is widely used for PHN throughout the world. About 60% of PHN cases responded more or less to TENS therapy in our department. This result is similar to those reports from other institutions.

Recently, a minute cordless TENS was developed in Japan through our request. It is extremely convenient for daily life.

Acupuncture

Acupuncture is more effective than TENS. In our department, we often experience favorable effects with electrical acupuncture in treating difficult PHN cases.

SSP electrode, which is not inserted into the body was developed about 20 years ago. These electrodes are attached at acupoints like acupuncture. The effect is similar to that of acupuncture.

ture.

Drugs

Usual anti-inflammatory or analgesic drugs are not effective for most PHN. Rather, anti-depressant or anti-convulsant are effective in some cases. In our clinic oriental herbal drugs are often used. These are useful for regulating and harmonizing the whole body, alleviating the persistent pain.

Aspirin application

The application of aspirin powder dissolved in liquid chloroform with a brush on body surface has been recently reported as one of the effective treatment for herpetic neuralgia.

We evaluated its effect. Pain is actually relieved within 20 minutes in all cases including refractory PHN. However, we found that this treatment is only useful for PHN with a short history of illness.

Recently, we have started to use indomethacine ointment, which is equally effective and more convenient for home use. Consequently therapeutic results for refractory PHN have improved considerably in recent years by taking advantage of these various methods.

Conclusion

1) Herpes zoster in aged patients should be treated with nerve block as early as possible. This prevents HZ from developing to PHN.

2) PHN having over 1 year's history rarely responds to even nerve block treatment. However, recent data show that improvement rate have increased due to the introduction of various new effective methods.

Recent Developments in Pain Clinic Activities in Japan

The development of pain clinic(PC) all over

the world has been phenomenal. There are so many different treatment methods applied in PC's that it is easy to misunderstand or be confused by the term PC. This situation has made it necessary to establish standard guidelines for both PC institutes and practitioners. In 1990, the IASP Task Force announced guidelines for the PC. Facilities which treat chronic pain can be classified and defined as follows:

1. Multi-disciplinary pain center
2. Multi-disciplinary pain clinic
3. Pain clinic
4. Modality oriented clinic

The IASP Task Force strongly emphasizes the idea of a multidisciplinary array of diagnostic and treatment facilities. Chronic pain is so complex that comprehensive, integrated approaches must be provided.

In Japan the PC has a fairly long history, going back 25 years. Presently, there is a PC in every University hospital, as well as in some of the larger hospitals. Recently there has been a great increase in the number of members in private PC's. In fact, the private PC may lead the future of PC activity in Japan. The multi-disciplinary approach is widely adopted in all of the PC's.

The Japanese Society of Pain Clinicians (JSPC) was established in 1965, giving it a 25 years history. This society has 2,658 members, as of July 1991, and convenes annually.

Incidentally, in Japan there is another society concerning pain treatment, called the Japan Association of the Study of Pain(JASP). This society belongs to the Japanese chapter of the IASP and has a total of 680 members. Any medical staff interested in pain treatment can become a registered member. The main purpose of the society is to promote the relationship between fundamental science and clinical medicine.

The IASP Task Force is also emphasizing the

importance of education for young health care providers who may wish to enter these fields, Standards for physician fellowship in pain management were recently issued. For instance, a minimum of a year training at a specially designated facility is required.

In Japan, a certified pain clinician fellowship system was established and standards were issued two years ago. Although the contents of this system resemble the standards suggested by the IASP, the system in Japan is far stricter.

Physicians who wish to qualify as specialized pain clinicians in Japan must fulfill the following prerequisites set by the Japan Society of Pain Clinicians(JSPC). After qualification, the candidate becomes eligible to take an examination. Upon passing the examination, the candidate is then awarded a certificate. As of July 1991, 350 specialists have obtained their certifi-

cates in this manner.

As for the standards for a pain treatment facility, the institute must fulfill the following requirements specified by the JSPC. Namely, there must be a designated Director of Fellowship in the institute. The Director is responsible for the design and implementation of the fellowship. Furthermore, the director should have extensive experience in the management of chronic pain patients. There must also be other staff besides the director. The institution must have suitable space, a large variety of patients, appropriate resources, and sufficient educational materials.

In conclusion, PC activities have expanded greatly in various countries and particularly in Japan. The proliferation of the PC promises to accelerate developments in pain management and related research.