

Pain Relief with Intravenous Regional Guanethedine in Post-traumatic Reflex Sympathetic Dystrophy — A Case Report

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Summary

Intravenous regional guanethedine (IVRG), using the Bier's block technique, was given to relieve pain in a 62 year old Indian woman suffering from reflex sympathetic dystrophy. The patient obtained complete pain relief with 2 injections and has remained pain-free for 18 months.

Key words: Reflex sympathetic dystrophy, guanethedine.

Introduction

Reflex sympathetic dystrophy (RSD) (also known as post-traumatic reflex sympathetic dystrophy, Sudeck's osteodystrophy), is manifested by pain, usually burning pain, hyperesthesia, vasomotor and sudomotor disturbances, increased muscular tone and later weakness, and trophic changes involving the skin, its appendages, muscles, bones and joints. Sympathetic blockade¹ along with physical therapy is the mainstay of current therapeutic management. We present a case of RSD who obtained complete relief of pain with intravenous regional guanethedine as described by Hannington-Kiff².

Case Report

Mrs DP, a 62 year old Indian housewife, was admitted to University Hospital, Kuala Lumpur, in August 1990, with a swollen and deformed left elbow following a fall at home. X-rays revealed a transverse fracture of the left olecranon process, which was internally fixed with tension band wires under brachial plexus blockade. Post-operatively, she was allowed to mobilise without any plaster and was discharged the next day.

At the follow-up clinic 2 weeks later, she complained of 1 week duration of pain and stiffness in the left hand. The hand was noted to be mildly oedematous with markedly restricted movements at the metacarpo-phalangeal and interplangeal joints of all fingers and thumb. The elbow joint was not painful, though there was some limitation of movement. Intensive physiotherapy was started and continued over the next 3 weeks.

The pain, however, increased, and there was no improvement in joint mobility. X-rays showed osteoporosis and she was referred to the Pain Control Clinic for further management.

Pain control clinic

The patient was found to be considerably incapacitated, with moderately severe pain in the left hand. She described it as a constant, deep ache with occasional sharp twinges radiating up the forearm. Pain scores on the Visual Pain Analogue Scale (VPAS) were 6 in the daytime and 9 at night. Some relief was obtained by immersion in warm water. Cold aggravated the pain and there was no relief with either codeine or NSAIDs. The skin over the dorsum of the hand was shiny, warm, slightly swollen with marked restriction of movements of all the joints of the left hand. She was depressed and unable to carry out even simple domestic chores. A diagnosis of reflex sympathetic dystrophy was made. We decided to try intravenous regional guanethedine blocks to the left arm followed by intensive physiotherapy.

Guanethedine (Ismelin^R-Ciba Geigy) is a post-ganglionic pre-synaptic sympatholytic agent. It displaces nonadrenaline (NA) from its storage sites in the pre-synaptic vesicles and prevents the reuptake of NA from the synaptic cleft. This strong affinity of guanethedine to neural tissue results in a prolonged sympathetic block³. Guanethedine blocks have been shown to relieve the pain and hyperpathia of reflex sympathetic dystrophy^{4,5,6}.

IVRG-technique (modified after Hannington-Kiff²)

The method is similar to Bier's block (which is familiar to all anaesthetists). The left arm was exsanguinated with an Esmarck's bandage after securing an intravenous access. A tourniquet was applied to the arm and inflated to a pressure of 200 mmHg.

Ten mg of guanethedine in 30 ml of 0.5% prilocaine (local anaesthetic drug) was injected intravenously into the isolated left arm. The tourniquet cuff was left in place for 20 minutes. The procedure was undertaken with the patient supine, an IV cannula in place on the right hand and with resuscitation facilities available. The blood pressure was monitored for half an hour after the cuff was deflated.

Five minutes after cuff deflation, the arm was noticed to be warmer than the other unblocked extremity. Skin temperature, monitored over the dorsum of the left hand (YellowSpring Instrument Co cutaneous thermistor), was 2.0°C more than the right dorsum. The left arm also showed generalised muscle weakness and numbness lasting about 2 hours, from the residual effect of the local anaesthetic, prilocaine, used as the vehicle for guanethedine.

Following the IVRG block, the patient experienced dramatic pain relief, which persisted over the next few days. On review a week later, she was more cheerful, her pain scores (VPAS) were 3-4, but the stiffness persisted. A repeat IVRG block was done to augment the sympathetic blockade. This time there was complete relief (Pain score=0). She was persuaded to continue with intensive physiotherapy which was now possible as she had no pain. Regular follow-up showed no recurrence of her pain. In her last follow-up, 18 months after IVRG, the range of movements of the small joints in her left hand had increased by 75% and the total pain relief had been maintained without any analgesics.

Discussion

The pathogenesis of reflex sympathetic dystrophy and the role of the sympathetic nervous system has been the subject of much discussion. Many theories have been proposed — although none has proved conclusive — ever since Mitchell⁷, in 1864, described the condition in soldiers during the American Civil War. Sympathetic blockade, if performed early in the course of the disease, helps to relieve the burning pain and hyperpathia. Stellate ganglion block and lumbar paravertebral ganglion block are the standard clinical procedures used to provide sympathetic block in the upper and lower limbs respectively. There are, however, limitations to these blocks. They require expertise, and the local analgesic solutions used for the neural blockade provide only a short duration of analgesia. With stellate ganglion blocks there is a risk of pneumothorax and the added discomfort of miosis, ptosis, enophthalmos (Horner's triad) nasal congestion and anhydrosis. Lumbar sympathetic blocks

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require the use of an image intensifier for accurate placement. Both these blocks are contraindicated if the patient is on anticoagulants.

Hannington-Kiff², in 1974, developed this technique of IVRG which has since become widespread. It is a technique that is familiar to all anaesthetists and does not require much expertise or equipment. Initially, the guanethedine was diluted with normal saline and sometimes with 500 u of heparin. This results in an initial exacerbation of pain lasting 2 to 3 minutes due to the effect of NA, which is initially displaced from the nerve endings. To reduce this discomfort, guanethedine is now diluted with 0.5% prilocaine (local anaesthetic). Patients sometimes complain of discomfort from the pressure of the tourniquet that is kept on for 20 minutes. A simple explanation and reassurance prior to the procedure is usually all that is necessary for patients to tolerate the pressure from the cuff. The use of a double cuff (if available) reduces the discomfort.

Skin temperature recording from the blocked and unblocked hands was done to demonstrate the increase in cutaneous temperature due to sympathetic blockade. Other objective tests that can be used to assess sympathetic blockade are the sweat test, ice response to hand blood flow or the sympathogalvanic response. These tests were not done, as the facilities to conduct them were not easily available. The grip strength test to demonstrate no somatic blockade is invalid in our case as prilocaine was used.

Guanethedine gets fixed to the tissues in 10 to 15 minutes, hence very little guanethedine gets into the circulation when the cuff is released. However, the blood pressure should be monitored for at least half an hour after tourniquet release, and the patient kept horizontal. This is especially important in hypertensive patients on antihypertensive drugs. This procedure should also be done with resuscitation facilities easily available in case of accidental deflation or a leaking tourniquet.

Physiotherapy should be instituted as soon as possible; passive exercises to stiff joints can be started during the procedure, taking advantage of the dense sensory block of the local anaesthetic. The return of mobility and function to the limb should be the main goal and this is only possible if pain can be relieved.

Guanethedine blocks are usually repeated at weekly intervals and the number of blocks required varies, depending on the patient's response. The average is about 3 to 4 blocks. The blocks may need to be repeated at 3 day intervals at first, in severe cases, to maintain the sympathetic blockade. The dose may also need to be increased to 20 mg per block, depending on the patient's response and severity of the condition. In some pain clinics (National Orthopaedic Hospital, Stanmore, UK) it is not uncommon for patients to have 10 to 15 blocks for tolerable pain control.

IVRG is a simple pain procedure that can be used to effectively control the pain of reflex sympathetic dystrophy. It is more effective if tried early in the course of the disease. It can be repeated and no serious side-effects have been reported⁸. Pain relief in RSD is important, as it allows intensive physiotherapy for functional rehabilitation. It can reduce the pain and make it more tolerable or it can occasionally provide complete relief as in this patient. IVRG can also be used in vasospastic conditions like Raynauds disease and phenomenon⁹, patients with vascular insufficiency and rest pain and chronic non-healing ulcers¹⁰.

Conclusion

The pain of reflex sympathetic dystrophy can be extremely distressing to patients. The pain is often difficult to relieve and patients often require multiple blocks, intensive physiotherapy and psychological support for complete rehabilitation. IVRG is one method that should be tried and it is extremely gratifying if it produces complete pain relief.

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