J. max.-fac. Surg. 9 (1981) 101–102
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Cryoanalgesia in the Management of Chronic Facial Pain

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Summary

The results of 85 cryogenic nerve blocks in 43 patients with chronic facial pain over a period of 4 years are reviewed. In 67 % of patients with non-herpetic neuralgia the duration of pain relief (median 93 days) exceeded the duration of sensory loss (median 60 days).

Key-Words

Cryotherapy; Pain; Intractable; Nerve block; Facial neuralgia

Introduction

Cryotherapy has been used to produce an extended but reversible nerve block in the management of chronic pain (*Lloyd* et al. 1976, *Barnard* et al. 1978), and post-operative pain (*Wood* et al. 1979, *Katz* et al. 1980, *Glynn* et al. 1980). The results of the use of cryoanalgesia to block peripheral branches of the trigeminal nerve in the management of patients with chronic facial pain are presented.

Patients and Methods

54 patients with chronic facial pain were treated by cryogenic blockade. The mean duration of pain prior to cryoanalgesia was 11 (1–55) years for the patients with non-herpetic neuralgia, and 5 (0.25–16) years for patients with post herpetic neuralgia. Where the pain was abolished by a diagnostic block of lignocaine or bupivicaine, the relevant nerve was exposed by dissection, usually under local analgesia. The nerve was isolated and frozen (Fig.) with 2 one minute freeze-thaw cycles with a fine cryoprobe, (Spembly Lloyd Neurostat) and the wound was closed. A thermocouple registered the minimum probe tip temperature at –60° to –80°C.

Fig. 1 Application of fine cryoprobe to right infraorbital nerve via an intraoral approach.

Pain relief was recorded as the period in days during which the patient stated that he was free of pain, or felt that he was considerably improved. Sensory function was assessed by the ability of the patient to feel light touch and a sharp pinprick over the innervated area of the nerve which was frozen.

Of the 54 patients treated, 10 failed to attend for follow up and one died from carcinomatosis, and these were eliminated from the review. Of the remaining 43 patients, 6 had 2 nerves blocked, and 25 patients had repeated blocks of the same nerve making a total of 85 blocks. The minimum period of review was 3 months and the maximum 4 years.

Results

The duration of pain relief and sensory loss following cryoanalgesia in various diagnostic categories is shown in Table 1. In 5 cases of non-herpetic neuralgia patients reported a residual feeling of altered sensation, though the innervated area responded to prick and light touch. Sensory loss was not assessed on the post herpetic group as there was often residual sensory deficit from the acute infection which confused the assessment of changes due to the block. The duration of pain relief exceeded the period of sensory loss in 67 % of patients with non-herpetic neuralgia. (Tic doloureux 83 %;post surgical or post traumatic neuralgia 60 %; atypical facial neuralgia 27 %). Repeated blocks did not produce a consistently greater of smaller duration of pain relief. A summary or pain relief following cryoanalgesia is shown in Table 2.

Discussion and Conclusion

The extended nerve block which follows cryoanalgesia has been shown to be associated with Wallerian degeneration (*Barnard* 1980). The duration of the block is related to the distance which the nerve must regenerate from the point of freezing to the innervated area and in this series in which peripheral branches of the trigeminal nerve were frozen, the median duration of sensory loss was 60 (5–117) days. Cryogenic blockade is an all-or-none phenomenon and the blocks of short duration (minimum 5 days), reflected a failure to freeze the nerve adequately and produce complete structural degeneration. It is important to distinguish the extended functional loss associated with peripheral degeneration following application of extreme cold (cryoanalgesia) from the transient functional block associated with nerve cooling (*Denny-Brown* et al. 1945). *Katz* et al. (1980)

0301–0503/81 1400–0101 $ 03.00 © 1981 Georg Thieme Verlag Stuttgart · New York

Table 1 Patients treated by cryogenic blockade – results

Diagnosis	Patient treatments	Pain relief (days) Median	Range	Sensory loss (days) Median	Range
Non herpetic neuralgia	59	93	0–1254	60	5–117
Tic doloureux	24	186	0–1236	67	14–80
Post surgical neuralgia	20	68	0–1254	56	42–117
Atypical facial neuralgia	15	42	0–820	60	5–116
Post herpetic neuralgia	26	36	0–189		

Table 2 Summary of pain relief following cryogenic blockade

Diagnosis	Pain relief >6 weeks	>6 months	>1 year
Non herpetic neuralgia	65 %	32 %	17 %
Tic doloureux	83 %	46 %	16 %
Post surgical neuralgia	65 %	30 %	15 %
Atypical facial neuralgia	47 %	20 %	20 %
Post herpetic neuralgia	42 %	3 %	0 %

recently reported return of sensation in 30 days following the freezing of intercostal nerves at thoracotomy, and in view of the distance required for regeneration the duration might be expected to have been greater. This may reflect a failure to achieve complete degeneration of the nerve, in which case an alternative mechanism has to be considered for the analgesia achieved.

The relationship between the nerve block and subjective experience of pain relief by the patient was less predictable. Patients with pain of non-herpetic aetiology responded more favourably than those with post herpetic neuralgia (See Tables 1 and 2). 67 % of patients with pain of non-herpetic aetiology had pain relief for a period exceeding that of sensory loss and the reason for this is unclear. As previously reported this may represent the breakdown of an established pain cycle involving central and peripheral pathways (*Barnard* 1980).

The maximum period of pain relief in this review was 3.5 years and the patient is still pain free. No patient suffered aggravation of their symptoms following treatment, which was well tolerated.

The management of chronic pain is often empirical, and employs techniques which interrupt or modify pain pathways but which do not incapacitate the whole patient. As the response to treatment of patients with chronic pain is often unpredictable it is desirable to select techniques which do not produce irreversible damage to the nerve or precipitate secondary neuralgia. In this respect cryoanalgesia appears to offer advantages over other methods of long term nerve block or neurectomy, and may result in prolonged relief in some patients.

References

Barnard, D.: The effects of extreme cold on sensory nerves. Ann. R. Coll. Surg. Eng. 62 (1980) 180

Barnard, J. D. W., J. W. Lloyd, C. J. Glyn: Cryosurgery in the management of intractable facial pain. Br. J. Oral Surg. 16 (1978) 135

Denny-Brown, D., R. D. Adams, C. Brenner, M. M. Doherty: The pathology of injury to nerve induced by cold. J. Neuro Path. Exp. Neuro 4 (1945) 305

Glyn, C. J., J. W. Lloyd, J. D. W. Barnard: Cryoanalgesia in the management of pain after thoracotomy. Thorax 35 (1980) 325

Katz, J., W. Nelson, R. Forest, D. L. Bruce: Cryoanalgesia for post thoracotomy pain. Lancet i (1980) 512

Lloyd, J. W., J. D. W. Barnard, C. J. Glyn: Cryoanalgesia – a new approach to pain relief. Lancet ii (1976) 932

Wood, G. J., J. W. Lloyd, P. J. D. Evans, R. E. S. Bullingham, B. J. Britton, D. R. A. Finch: Cryoanalgesia and day case herniorrhaphy. Lancet 11 (1979) 479

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