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# CASE REPORT - FALLBERICHT

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# Percutaneous Electro Stimulation of the Trigeminal Nerve in Patients with Atypical Trigeminal Neuralgia

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### Summary

In eleven patients with atypical trigeminal neuralgia, following herpes infections or radiation therapy of cancer of the epipharynx, percutaneous electrical stimulation of the trigeminal tract or in the vicinity of the nucleus area was performed. Relief of pain lasting from fourteen days up to six weeks could be obtained.

Key words: atypical trigeminal neuralgia – trigeminal tract – percutaneous electrical stimulation

#### Zusammenfassung

Eif Patienten mit einer atypischen Trigeminusneuralgie als Folge von Herpesinfektionen oder nach Bestrahlung von Epipharynxneoplasmen wurden perkutan im Bereich des Trigeminushauptstammes bzw. die Kerngebiete direkt stimuliert. Die Elektroden wurden perkutan von zervikal her eingeführt. Durch 24-48stündliche Elektrostimulation konnte eine Schmerzfreiheit von 14 Tagen bis zu 6 Wochen erzielt werden.

Controlled selective thermocoagulation has become the method of choice in the treatment of typical idiopathic trigeminal neuralgia. However in patients, presenting with atypical trigeminal neuralgia, the relief of facial pain is a continuing and as yet unsolved problem. The term atypical trigeminal neuralgia is used here for such varieties as severe dysaesthesia following electrocoagulation treatment, anaesthesia dolorosa resulting from surgical denervation procedures for facial pain secondary to a herpes infection within the trigeminal nerve region. Also encountered are hypaesthetic or anaesthetic forms of facial pain following radiation therapy in patients for cancer of the epipharynx which usually implies injury to the retroganglionic portion of the trigeminal nerve.

Studies by Gobel and Hopenstein (1, 2) are in support of the existence of a modulation mechanism which is thought to be located within the substantia gelatinosa of the trigeminal nerve which may inhibit transmission of pain by stimulation of beta nerve fibres. This would then be analogous to the function of the dorsal column with regard to peripheral pain transmission (3).

Based on these considerations, an attempt was made to use electrical stimulation for the management of patients presenting with atypical neuralgia. For anatomical reasons, how-

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Fig. 1: 1 coiumn cord an

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# Percutaneous Electro Stimulation of the Trigeminal Nerve in Patients

ev. it is not possible to use transcutaneous electrical stimulation for the stimulation of [ the trigeminal tract or the trigeminal ganglich, as is well-known from the poor resultobtained by transcutaneous nerve stimulation in patients with idiopathic trigeminal neuralgia. We have therefore tried to perform direct stimulation of the trigeminal tract close to the broinstem and in the vicinity of the nucleus atim

## Technique

The initial approach is similar to that described for percutaneous cordotomy (4). Using a Thouy-needle, the spinal canal is punctured under x-ray control between the first and second vertebra. The anterior spinal canal and the ligamentum denticulatum are then outlined by Pantopaque (Fig. 1). A Teflon isolated stimulation electrode is inserted and placed ventrally and on the contralateral side of the spinal cord. The Thouy-needle is then turned around in order to allow further introduction of the electrode towards the cranial cavity until the uninsulated tip is brought into position close to the edge of the pyra-



Fig. I: Lateral x-ray view of the cervical vertebral column showing the anterior border of the spinor cord and the dentate ligament outlined.

and Fig. 21. Whenever possibled the electrode should be placed right within the incisura-trihemmin. If the positioning of the electrode is alog 2 hampered, e. g. due to subarachnoid albestons, it is recommended to turn the paturn's head several times which will usually allow one to proceed with the procedure. Unstreet placement of the electrode is verified by the patient starting to complain of sensa-





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tions within the trigeminal region. The Thous-needle is then removed and the electrode secured by a skin suture. Stimulation is thereafter continued over periods of 24-43hours with the patient being able to control the stimulation device by himself. Stimulation was performed with 250 cycles/sec. using varying current intensities. Adequate stimulation paraesthesia could be achieved with a low current intensity in patients suffering from dysaesthesia secondary to surgical procedures on the Gasserian ganglion. whereas patients with herpes neuralgia had to use higher current intensities. During the entire stimulation period the position of the electrode remained unchanged in all patients. There were no complications in our series related to the implantation of the electrode or to the stimulation with high frequency current. There were in particular no signs of ataxia, irritation of the vagus nerve or sexual sensations as reported for stimulation procedures in the upper spinal cord area (2).

# Clinical results

Five patients suffering from postherpetic neuralgia reported relief of pain lasting from 14 days up to 6 weeks after a stimulation period of 48 hrs. Hyperpathia was significantly reduced or even absent. Reactive skin changes such as reddening or tumefaction within the dependent area could be easily managed. In three additional patients with anaesthesia doiorosa or severe dysaesthesia following electrocoagulation procedures, stimulation resulted in a relief of pain for up to four weeks. Similar results were obtained in a group of three patients presenting with anaesthesia dolorosa secondary to radiation therapy. Following test stimulations they were free of pain for up to four weeks. Two of them had previously had several unsuccessful surgical procedures within the Gasserian ganglion area. Following these encouraging results, we have since implanted in three patients permanent percutaneous electrodes connected

10 a receiver system (Fig 3.. Two of them, staying under continous stimulation, were off all analgesic medication until they died from metastases. In the third patient the satisfactorily functioning unit had so be removed six month later when he developed ulceration of his skin as a result of local radiation therapy for a skin metastasis. Even over long periods of time, as in the latter threee patients, the position of the electrode did not change. In no case were any signs of meningeal reaction noticed.

# Comment

From the preliminary results, it is suggested, that patients with otherwise intractable and atypical trigeminal neuralgias may benefit from percutaneous electrical stimulation of the trigeminal nerve. Further progress in this field, however, will be largely dependent on technical improvements of our present electrode material.



Fig. 3: Percutaneous permanent implanted electrodes for trigeminal nerve stimulation.

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# Giant intramedullary ependymoma. A case report

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### S:::nmary

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After a review of the international literature, the authors report a case of intramedullary ependymoma extending from the 1st cervical level to the 1st lumbar level completely removed in a one stage operation.

The good functional recovery of the patient is emphasized.

Key words: Spinal tumor – Ependymona – Panmedullary tumour – Spinal surgery – Laminectomy

#### Zusammenjassung

Nach einem Literaturüberblick berichten die Autoren über einen Fall mit einem intramedullären Ependymom, das vom 1. Zervikalwirbel bis in den oberen Lumbalbereich reichte, und das komplett in einer Operation entfernt wurde.

Die Autoren betonen die gute funktionelle Erholung des Patienten.

## Introduction

In the field of giant intramedullary tumours, the "ependymoma" is of special interest from a surgical point of view, as it can be subjected to total extirpation and is sometimes followed by a surprising functional recovery. Even the widest statistics available (Guidetti, Greenwood) seldom report a tumour of this kind extending over more than ten vertebral segments. In fact as far as we know only seven cases have been reported (table 1), and of these only three can be classified as "panmedullary tumours".

The following report deals with a case that has recently come under our observation.

## Case report

Mr. D. C. R., aged 31. For two years the patient had been suffering from paraesthesiae of his lower right limb. Some months later he began to suffer from a progressive motor paralysis in his right arm and leg; with a superficial and deep right hemi-hypoaesthesia, ataxic disturbance on walking and signs of increased intracranial pressure and bilateral hypoacusis. He was admitted to a neurological department, then submitted to a right carotid angiography and to a pneumoencephalography with negative results. He was also submitted to a myelography by Myodil indicating a mid-dorsal medullary block, that was however considered as due to a technical error. He was discharged with diagnosis of "polysclerotic syndrome" and ordered one year's medical therapy.

Later, due to a rapid and progressive worsening of his condition, he was admitted to our University Neurological Department.

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