Efficacy of glycerol rhizotomy in trigeminal neuralgia: case-series

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الخلاصه:

علاج الام متلازمة العصب القحفي الخامس بواسطة حقن مادة الكليسيرين حول عقدة العصب القحفي الخامس في قاعدة الجمجمه بواسطة ابرة السائل الشوكي من خلال ثقب صغير عبر الجلد في الوجه ثم اجراءها على 45 مريض خلال الفتره من شهر مايو من عام 2008 والى شهر حزيران من عام 2012 وتمت متابعتهم خلال فترة ما بين 2-24 شهر بعد حقن مادة الكليسيرين. جميع المرضى المشمولين في هده الدراسه هم في مرحلة عدم استجابة للادويه في علاج حالتهم اختفى الالم في 42 مريض(93,3%) ولم يحتاجوا الى ادويه اضافيه بعد الحقن ومن تبعات هده العمليه 30مريض(66,7%) يشعرون بالخدر في الجهه التي كانوا يعانون من الم فيها وعاود الالم في 4 مرضى(8,9%) و3 مرضى(6,7%) لم يستجيبوا للعمليه . ومن هنا نستنتج ان عملية حقن مادة الكلسيرين توفر طريقه امنه و معتمده لعلاج الام متلازمة العصب القحفي الخامس وتعتبر الطريقه مناسبه لكبار السن.

Abstract

Treatment of trigeminal neurolagia by percutaneous retrogasserian glycerol rhizotomy was assessed in a series of 45 patients during the period from May 2008 through June 2012 with a follow up period ranging from 2 to 24 months postoperatively. All patients enrolled in the present study were considered medical failures before the procedure. Achievement of substantial pain relief was reported in 42 patients (93.3 %) and no further medical treatment was needed. Outcome also included

reduction in facial sensation in 30 patients (66.7 %) and recurrence in 4 patients (8.9 %). Failure of treatment was seen in 3 patients (6.7 %).

Conclusion: percutaneous retrogasserian glycerol rhizotomy offers safe and reliable relief of pain in patients with trigeminal neuralgia; low recurrence rate and long lasting reduction in facial sensations are the major disadvantages; nonetheless, it is by far, in our opinion, the method of choice in elderly particularly high risk patients.

Key words: trigeminal neuralgia, glycerol rhizotomy

Introduction

Trigeminal neuralgia (TN) is regarded as one of the most frequent reasons of pain in the face that is observed by neurologic specialists. Knowledge of this classic neuropathic pain has extended for centuries [(1)]. The disorder is defined by, The International Headache Society (IHS), as a "unilateral disorder that is characterized by short electric shock-like pain attacks that are abrupt in onset and termination, and are limited to the territory of one or more branches of the trigeminal nerve" [(2)]. Onset of the idiopathic disease usually starts at 40 and 60 years; however it might be earlier especially in women [(3)]. The overall incidence of trigeminal neuralgia (TN) according to Epidemiological studies, is aaround 4-28.9 per 100,000 individuals [(4-7)]. Treatment approach includes a variety of medical and surgical treatments: antiepileptic drugs (AEDs) stand as the mainstay treatment for TN with variable efficacy and the drug of first choice being is carbamazepine [(6-10)]. When control of pain is not achived by medical treatment the role of surgical intervention comes into consideration. Percutaneous trigeminal rhizotomies, microvascular decompression (MVD) and gamma knife radiosurgery (GKRS) are probably effective in the management of TN [(11)].

The exact cause of TN remains elusive and unclear [12, 13]. Nevertheless, majority of cases result from compression of the trigeminal nerve root throughout a few millimeters of entrance into the pons [9,14]. This nerve compression is frequently associated with a demyelination of sensory fibres at the nerve root or the root entry area, or less frequently in the pons [15]. About 80-90% of idiopathic TN are due to vascular compression by an aberrant loop of an artery or vein [14]. Other factors that may cause compression include benign tumors of the posterior cranial fossa like acoustic neuroma, meningioma and epidermoid cyst [9, 16].

Patients and methods

Patients selection and preparation

The present study was design to include, as a case series study, 45 patients with typical TN pain throughout the period extending from May 2008 through June 2012. The center of the study was the neurosurgery unite at Al-Dewaniyah teaching hospital/ Al-Dewaniyah province/ Iraq. Inclusion criteria included patients with pain without trigger, those with medical treatment failure whereas exclusion criteria were those patients with definite skull base lesion or tumor and vascular anomaly. Each patient was investigated for bleeding tendency; ECG and chest X-ray were carried if indicated. Patients on anti-platelets where informed to discontinue medication one week before time of procedure.

Anesthesia technique

Continuous monitored intravenous deep sedation at the operating room. Monitoring of pulse rate, respiratory rate, oxygen saturation and blood pressure. Intravenous propofol together with a narcotic drug were used. In young patients, prior administration of 0.4 mg of atropine sulfate was use

to avoid vasovagal response that may occur during the procedure as a response to transovale needle penetration and the glycerol injection. When patients develop bradycardia, an i.v anticholinergic was used. Hydralazine was used to reduce blood pressure in case of transent hypertension response to pain or anxiety and also to keep systolic pressure below 160 to avoid facial hematoma that may accompany needle placement.

Surgical technique

The patient is placed supine on an operating table that allows control of head, leg, and body position. The surgical team works to obtain alignment of the head such that the petrous ridge is at the same level as the inferior orbital rim. The foramen ovale can often be visualized just inferior and lateral to the junction of the inferior and medial orbital rims. We clean the patient's face with povidone iodine70% , and towels are placed around the neck and upper chest as the area is draped. We mark an entry point by using an ink marker. This point is located 2.5 cm lateral to the corner of the mouth on the side of the pain. We also mark trajectories toward a point that is in line with the medial ipsilateral pupil and at a point 2.5 cm anterior to the external auditory canal. We use 1% lidocaine with a 25-gauge needle to create a small intradermal injection, and then a 21- or 23-gauge needle is used to inject lidocaine into the deep structures of the cheek. A gloved finger is placed inside the patient's oral cavity to prevent penetration of the mucosa either by the anesthetic needle or by the 20-gauge spinal needle used for the rhizotomy [(18)] .The 20-gauge needle is then inserted under fluoroscopic guidance along the marked trajectory toward the skull base; this is placed using an anteroposterior projection.

Using a lateral projection, the needle tip is directed at a point approximately 1 cm behind the posterior clinoid along the angle of the clivus. Penetration of the foramen ovale can sometimes be uncomfortable, and thus administration of a short-acting barbiturate or propofol is performed immediately prior to puncture. Penetration of the needle through the foramen ovale can be felt by the surgeon. The stylet of the needle should be removed to check for flow of CSF. If none is encountered, then the needle with the stylet replaced is advanced at 1-mm increments under fluoroscopic guidance until the trigeminal cistern is entered. The CSF flow should then be confirmed. If the needle is past the clival line with no flow of CSF, it may require adjustment; the most common problem is that the needle may be either too lateral in the cistern or too medial. If it is too lateral within the foramen ovale, the tip of the needle may be in the subdural or subtemporal space. Although the finding of CSF flow is desirable, its absence does not always preclude identification of the trigeminal cistern. This is particularly true in repeated procedures. The average volume of the trigeminal cistern is 0.25 ml, and it rarely exceeds 0.4 ml. The glycerol injection is performed also under fluoroscopic guidance. Again, the patient is placed into a semisitting position. After the injection, some patients experience ipsilateral periorbital discomfort and sometimes facial flushing. After the glycerol is injected, the needle is removed and a small adhesive bandage strip is placed on the skin entry point. We keep the patient at a semisitting position for 2 hours to prevent escape of glycerol into the posterior fossa. Most patients remain in the hospital overnight and are discharged home the next day or in the same day.

Results

The current study included 45 patients with a mean age of 51.02±7.56 years and age range of 41-66 years. The sample include 2 male patients (4.4 %) and 43 female patients (95.6 %). Majority of patients had right sided lesion (91.1%), whereas left sided lesion was seen in only 4 patients (8.9 %), table 1. Successful substantial improvement of pain was achieved in 42 patients (93.3 %) and, unfortunately, failure was reported in 3 patients 3 (6.7 %). Drawback was seen in the form of numbness in 30 patients (66.7%) and headache in 5 patients (11.1%). Recurrence was encountered in one patient (2.2%) 6 months after the operation and in 3 patients (6.7%) 24 months after the operation table (2).

Table 1: Demographic characteristics of the study sample

Characteristic	Value
Number of cases	45
Mean age (range) years	51.02±7.56 (41-66)
Gender	
Male: n (%)	2 (4.4 %)
Female: n (%)	43 (95.6 %)
Side of lesion	
Right: n (%)	41(91.1%)
Left: n (%)	4(8.9 %)

Table 2: Operation outcome

Characteristic	Value
Response	
Success: n (%)	42 (93.3 %)
Failure: n (%)	3 (6.7 %)
Recurrence	
6 months: n (%)	1 (2.2%)

24 months: n (%)	3 (6.7%)
Complications	
Numbness: n (%)	30 (66.7%)
Headache: n (%)	5 (11.1 %)

Discussion

The percutaneous treatments including glycerol rhizotomy (GR), balloon compression (BC) and radiofrequency thermocoagulation (RT) have been documented to give rise to substantial pain improvement after injury to pain fibers in the trigeminal nerve. Refering to previous works [17] these techniques bring about same effective symptom relief: pain control rates up to 90% following 6 months and arround 60% at 36 months. The most frequent registered drawbacks of these percutaneous approaches include dysesthesia (average, 8.3% in GR), masseter muscle weakness (average, 3.1% in GR), and numbness of cornea (average, 8.1% in GR); nevertheless, these outcomes seem to be better for patients with intolerable pain. Neuropathic pain has not been recorded secondary to these percutaneous modalities. Rates of recurrence are variable: up to 35% following 5 years in the previous review of GR. RT appears to show somewhat better result in comparison with the two other procedures, however, we have carried out GR as a percutaneous treatment for trigeminal neuralgia because of the lack of instruments and materials for RF. Gamma Knife radiosurgery (GKR) also demonstrates good pain control rates of 50–75% at 5 years [17], we did not performed this procedure also because of the in availability of instruments.

In conclusion percutaneous retrogasserian glycerol rhizotomy offers safe and reliable relief of pain in patients with trigeminal neuralgia; low recurrence rate and long lasting reduction in facial sensations are the

major disadvantages; nonetheless, it is by far, in our opinion, the method of choice in elderly particularly high risk patients.

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