Use of Computed Tomography Guide for Trigeminal Alcohol Neurolysis


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Abstract

Trigeminal neurolytic blocks (TNB) are usually guided with fluoroscopy or plain x-ray which gives us only two dimension pictures. **Objective.** To show our experience with CT guide to perform TNB, on high surgical risk patients with trigeminal neuralgia (TN). **Method and patients:** Twenty one patients with idiopathic uncontrolled TN, were included. All cases were monitored with EKG, pulse oximetry and NIBP. Local anesthesia with 1% lidocaine, a 22 gauge Quincke type spinal needle, 8.89 cm long was inserted according with the Gasserian ganglion block technique, until the needle tip reached the skull base, or a mandibular paresthesia was elicited. Immediately, a series of CT slides were done to identify the needle tip position. The needle tip was then walked carefully into the foramen ovale, and once a proper position was confirmed with another CT, the stylet was removed. After a negative CSF and blood aspiration proved, a 0.1 to 0.2 mL increments of dehydrated 98% ethanol were injected every 30 seconds up to 1 mL. **Results:** All cases but two were done as ambulatory procedures. Adequate pain relief was obtained in all but 3 patients. Eighteen patients were able to stop or decrease their previous pain medicines. Analgesia lasted up to 24 months of follow-up. Three individuals did not improve their pain. In one of these 3 cases, neurolysis was repeated but he did not respond to the block, and developed V2 anesthesia dolorosa. **Conclusions:** The main advantage of CT over fluoroscopy and plain x-ray is the exquisite visualization of the foramen ovale. The accurate placement of the needle tip inside the foramen ovale nullify the chance of injecting the neurolytic improperly, reducing the incidence of side effects. CT guide is more expensive than conventional fluoroscopy or plain x-ray, and requires an expert radiologist. Use of CT guide to perform NTB is an alternative to fluoroscopy.

Key words: CT scan guide, trigeminal neurolysis

Resumen

Los bloqueos neurolíticos del trigémino usualmente se hacen con guía fluoroscópica o radiológica que solo dan imágenes en dos dimensiones. **Objetivo.** Mostrar nuestra experiencia con TAC como guía durante la neurólisis del V
par. **Método y pacientes.** Se estudiaron 21 pacientes con neuralgia trigeminal idiopática rebelde. Se monitorizaron tipo, se anestesió con lidocaína y se insertó una aguja Quincke 22, de 8.89 cm de largo de acuerdo a la técnica original de bloqueo del ganglio de Gasser, hasta que la punta de la aguja llegó a la base del cráneo, o se observó parestesia mandibular. Se tomaron cortes TAC para ver la punta de la aguja y recolocarla si fuera necesario. Se colocó la punta de la aguja dentro del agujero oval lo que se confirmó con nuevos cortes TAC. Se retiró el estilete. Después de aspiración negativa para sangre y LCR se inyectaron incrementos de 0.1 mL a 0.2 mL de alcohol 98%, deshidratado, sin pasar de 1 mL en 30 segundos. **Resultados:** La neuralgisis trigeminal se realizó como un Procedimiento ambulatorio en 19 de los 21 pacientes. Se obtuvo alivio adecuado del dolor en 18 los cuales pudieron disminuir o suspender sus medicamentos previos. Tres individuos no obtuvieron respuesta, en uno de estos pacientes se repitió el bloqueo y tuvo anestesia dolorosa en V2. **Conclusiones:** La mayor ventaja de la TAC sobre la fluoroscopia y la radiología simple es la visualización exquisita del agujero oval. La colocación correcta de la punta de la aguja dentro del agujero oval nulifica la oportunidad de inyección inadecuada del neurolítico y reduce los efectos secundarios. La guía con TAC es más cara y requiere de un radiólogo experto. Esta guía tomográfica es otra alternativa para la neuralgisis trigeminal.

**Palabras clave:** Tomografía computada, neuralgisis trigeminal

### Introduction

Trigeminal neuralgia is an incapacitating disease that predominantly occurs in elderly patients, who may also have co-morbid health states. In the algorithm to treat trigeminal neuralgia invasive techniques are always proposed as the last resources. Percutaneous interventions over the trigeminal nerve are the treatment of choice in those patients suffering severe neuralgic pain on which surgical posterior fossa procedures carry significant risk in terms of morbidity and mortality. Tapas in 1911 was very first author to describe alcohol injection in Vth nerve neuralgias, followed by Harris and Hartel in 1912. Since then, many others have used trigeminal neuralgisis to alleviate these patients. There are others surgical and non surgical approaches to treat trigeminal neuralgia patients that have been proved their efficacy like Gamma Knife surgery, microvascular decompression, and some others. Every technique has their own indications, results and complications.

Trigeminal neurolytic blocks (TNB) are usually guided with fluoroscopy and/or plain x-ray which give us only two dimension pictures. The quality of the images is not as accurate as it is with computed tomography scan (CT). The purpose of this study is to show our experience with CT scan guide to perform percutaneous trigeminal neuralgisis on high surgical risk patients suffering medically intractable trigeminal severe pain.

### Method and patients

Twenty one consecutive patients with idiopathic uncontrolled Vth nerve neuralgia, and high surgical risk, were scheduled for alcohol neuralgisis under CT scan guidance. All cases were monitored with continuous electrocardiogram, pulse oximetry and intermittent non-invasive blood pressure. An intravenous line was started with 0.9 % saline, 1 to 5 mg of i.v. midazolam and 25 to 50 mg of i.v. fentanyl were given to produce a slight sedation. The blocks were performed with the patients on supine position on the CT scan table. Under local anestesia with 1% lidocaíne, using the standard anatomical landmarks, a 22 gauge Quincke type point spinal needle, 8.89 cm long was inserted according with the classical Gasserian ganglion block technique, until the needle tip reached the base of the skull or a mandibular paresthesia was elicited. Immediately, a series of CT scan slides were done in order to identified the needle tip position. The needle tip was then walked carefully into the foramen ovale, and once a proper position was confirmed with another series of CT scan slides (figure 1), the styllet was removed. After a negative CSF and blood aspiration proved, a 0.1 to 0.2 mL increments of dehydrated 98% ethanol were injected every 30 seconds up to 1 mL.

### Results

We were able to perform Vth nerve block in all cases without complications during the procedure. All cases but two were done as ambulatory procedures. Two patients were hospitalized during 24 hours because one was taking antiplatelets drugs, and has a history of recent myocardial infarction. The second hospitalized patient was under heavy...
psychiatric treatment. Adequate pain relief was obtained in all but 3 patients. Eighteen out of 21 patients were able to stop or decrease their previous pain medicines. Analgesia lasted up to 24 months of follow-up. Three individuals did not improve their pain. In one of these 3 cases, neurolysis was repeated but he did not respond to the block, and developed V₂ anesthesia dolorosa.

Discussion

High surgical risk patients suffering medically intractable TN are excellent candidates for percutaneous procedures at the level of the Vth nerve; the Gasserian ganglion or its peripheral branches, which can not only relieve the pain, but also eliminate or decrease the obnoxious side effects of drugs used to treat it. Percutaneous neurolysis of the trigeminal nerve is an old procedure,¹ ² ³ usually guided with fluoroscopy and/or plain film radiographs. These imaging methods, either alone or in combination, allowed us to place the needle on the desired target, but the images are not as accurate as the pictures produced by the CT as seen in figures.¹²

CT techniques introduced in the early 1970s revolutionized medicine producing high quality images. This modern technology has been used to guide neurolytic nerve blocks since the early 1980s. Celiac plexus and splanchic nerve block, lumbar sympathetic nerve block, superior hypogastric plexus block, stellate ganglion block, facet nerve block had been performed with the aid of CT guide. Selective neurolysis of several cranial nerves under CT guidance was first described in 1991,¹³ but it is not often used during trigeminal neurolysis. The main advantage of CT over fluoroscopy and plain x-ray is the exquisite direct visualization of the foramen ovale, allowing an exact placement of the needlepoint on the anatomical target.¹²,¹⁴,¹⁵,¹⁶ Once the needle is on the target, it is very important to assure that the dura has not been punctured. At this point we preferred to aspirate trough the needle, than to inject a contrast media to visualize if it remains localized in the region of the foramen ovale. The contrast media volume may dilute the alcohol to be injected, and may also reduce de volume of the neurolytic agent to be injected. The accurate placement of the needle tip inside the foramen ovale nullify the chance of injecting the neurolytic agent improperly, reducing the incidence of side effects due to incorrect neurolytic agent injection.

We where able to easily perform Vth nerve alcohol block in all cases, resulting in an excellent analgesia in all but three patients. Eighteen out of 21 cases were able to drastically reduce their pain medications, lessening the side effects of those drugs, like somnolence, confusion or vertigo, allowing a better way of life. One of the cases that did not response to the block developed anesthesia dolorosa on the maxillary nerve distribution.

CT guide is more expensive than conventional fluoroscopy or plain x-ray, and requires an expert radiologist. Although this investigation is based on 21 patients, the results encourage the use of CT guidance to localize the foramen ovale, and to properly place the tip of the needle during Vth nerve neurolysis.

References


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