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內文：

前言

三叉神經痛：

一種出現在臉上的陣發性疼痛，會突然的感到劇烈的疼痛，時間約數秒到兩分鐘左右，可能僅持續數天或數星期後便會長時間都不再出現陣痛的問題。陣痛的部位多是臉頰、下顎或口腔內，故患者常會誤以為是牙痛而做了許多牙科相關的治療卻不見任何成效，才被轉至神經科接受治療。常會在受到觸摸、冷風吹、觸水、咀嚼等情形下而引發陣痛，對患者來說在生活上會造成極大的影響。

通常三叉神經痛是因神經的根部受血管的壓迫所造成的，年齡的增長有可能導致血管彎曲並壓迫到神經根部，除此之外，腫瘤、動脈瘤或者血管畸形等均可能是造成三叉神經痛的原因。

在治療方面主要分為藥物治療與手術治療兩類，治療三叉神經痛的藥物常會許多的副作用，且必須常期服用，需經過醫師詳細的診斷並在醫師的指導下使用，若是對藥物治療反應不佳者可考慮使用外科手術治療，治療方法包括**組斷三叉神經傳導與減壓手術**等，手術各有利弊均需經過與醫師詳細的討論與了解後方可實行。

(華人健康網 <https://www.top1health.com/Article/157/299>)

Trigeminal neuralgia (TN)

- caused by **neurovascular compression (NVC)** at the **root entry zone (REZ)** of the trigeminal nerve in the cerebellopontine angle cistern(小腦橋腦角池).

- the most effective treatment: **microvascular decompression (MVD)**

-The diagnosis is made by **MR angiography(血管攝影)** and **MR cisternography(腦池造影術)**.

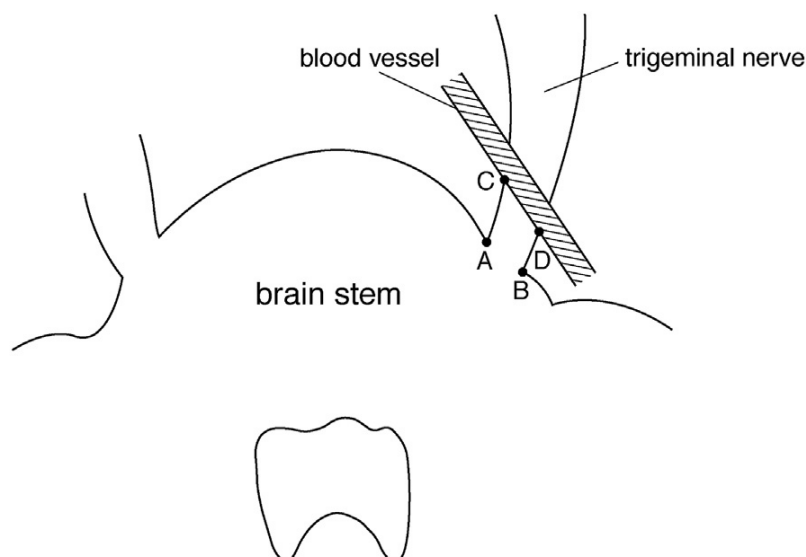
-NVC is also known to occur in asymptomatic nerves, that is, those contralateral to TN symptoms or those in asymptomatic subjects.

Background

Thus, the clinical significance of NVC detected on MRI has not been fully established. **Clarifying the distinction between symptomatic and asymptomatic NVC would further increase the validity of MRI for the treatment planning for TN.**

NVC is thought to be closely related to the distance from the trigeminal nerve root to the responsible blood vessel. However, to our knowledge, few studies have evaluated the relationship between this distance and the manifestation of TN.

Against this background, the purposes of this study were to analyze MRI findings regarding the location of NVC in both symptomatic and asymptomatic nerves, and to evaluate the relationship between these findings and the presence or absence of clinical symptoms of TN.



MATERIALS AND METHODS

This retrospective study was approved by our institutional review board (No.895).

Patients

- **147** consecutive patients with idiopathic TN (61 men and 86 women; age range, 21-93 years; mean age, 64.7 years) who underwent MRI at our hospital from April 2010 to November 2012.

-Excluded cases: 1. with brain tumor 2. multiple sclerosis 3.Recurrent cases after MVD

-All 147 patients had **unilateral** TN. Of those, 88 had TN on their right side and 59 on their left side.

-The diagnosis of TN was made according to the criteria of the International Headache Society. (In our study, we diagnosed NVC when there was **no apparent CSF** between the two structures on both transverse and coronal consecutive MR images)

Imaging examinations

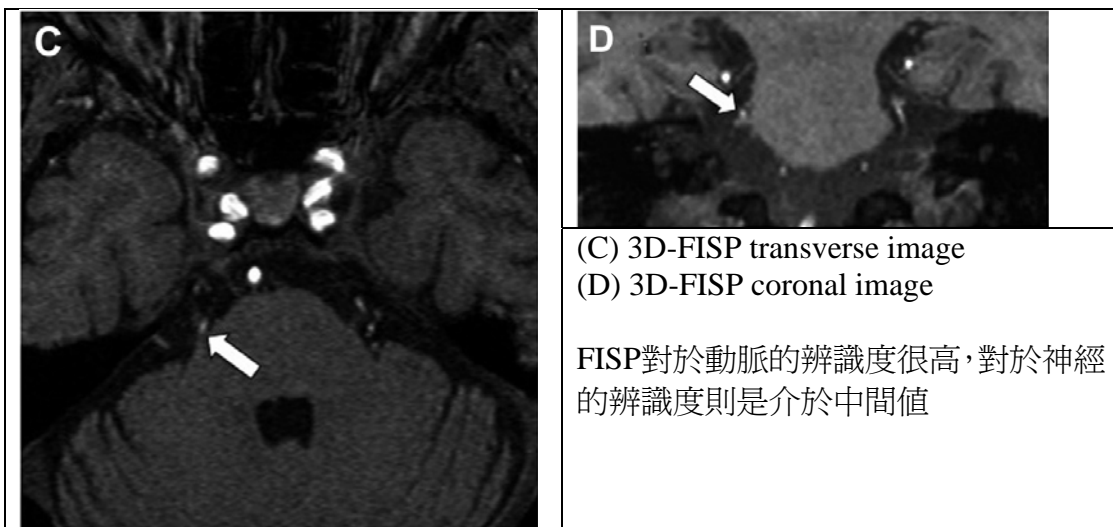
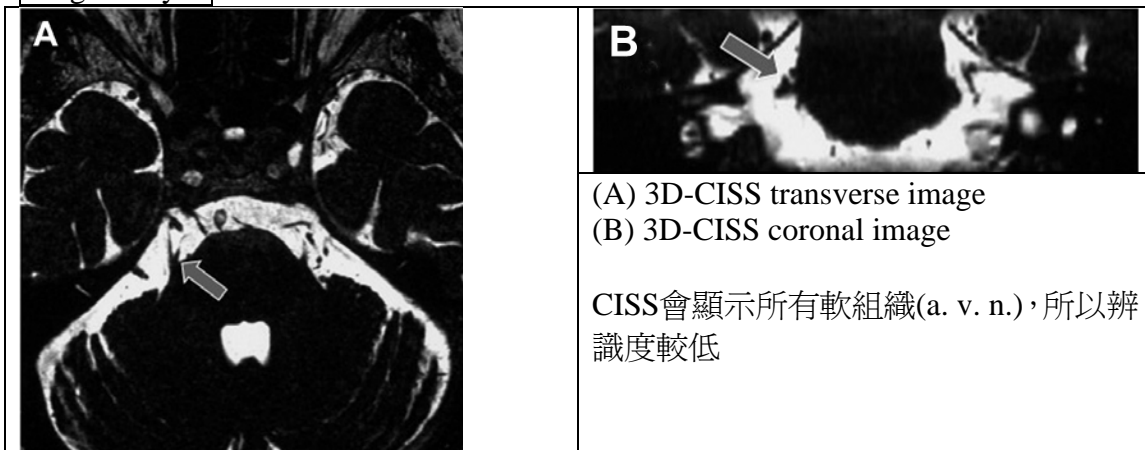
A 1.5-T superconducting system (Magnetom Vision, Siemens AG, Erlangen, Germany) with a 2.5 mT/m maximum gradient capability and a circularly polarized head coil was used to obtain all MR images. =>MRI型號

In all patients, transverse T1-weighted spin-echo images (repetition time/echo time [TR/TE] 560/14 msec) and T2-weighted turbo spin-echo images (TR/TE, 5000/ 96 msec; echo train length, seven) were obtained with a field of view of 230 _ 230 mm, a matrix of 256 _ 256, and a section thickness of 3mmwith a 1-mm intersection gap. These images were used to rule out the diagnoses of multiple sclerosis and brain tumor. =>MRI拍攝方式

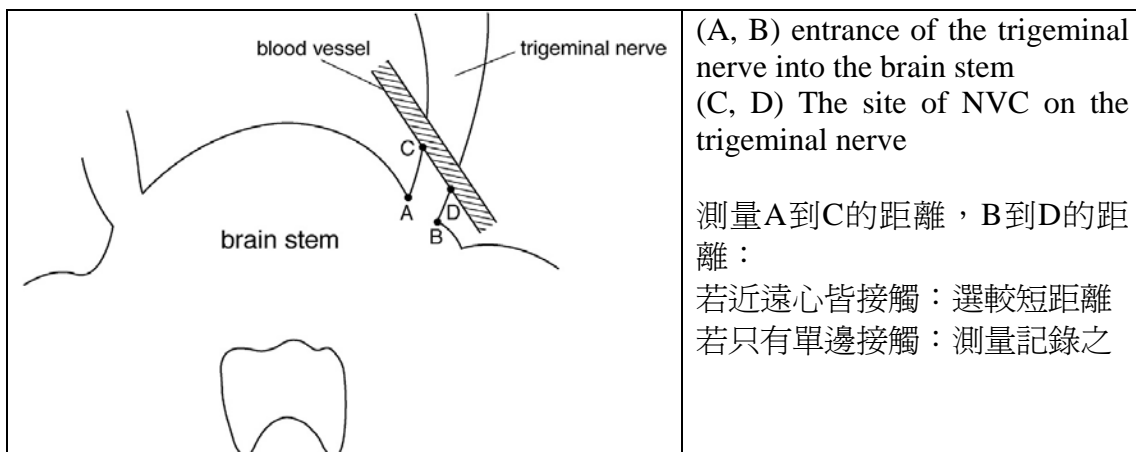
MR angiography was performed using a **3D fast imaging with steady-state precession (3D-FISP)** sequence with the following parameters: TR/TE 39/6.5 msec, 20-degree flip angle, 230 x 230-mm field of view, and 256 x 512 matrix. The other imaging parameters included a slab thickness of 60 mm with 60 sections, yielding transverse images with a section thickness of 1 mm. The acquisition slab was oriented in the transverse direction on the sagittal and coronal scout images so that both sides of the trigeminal nerve could be included in the image. After obtaining transverse images, coronal reformatted images were also obtained by using a multiplanar reconstruction (MPR) algorithm. =>血管攝影(3D-FISP)

MR cisternography was performed using a **3D constructive interference in steady state (3D-CISS)** sequence with the following parameters: TR/TE 12.25/ 5.9 msec, 70-degree flip angle, 230 x 230-mm field of view, and 512 x 512 matrix. The other imaging parameters included a 34-mm slab thickness with 34 sections, which yielded transverse images with section thicknesses of 1 mm. The acquisition slab was oriented in the same direction as in the 3D-FISP sequence. Coronal reformatted images were also obtained by using an MPR algorithm. =>腦池造影(3D-CISS)

Image analysis



The same two radiologists used a **DICOM viewer** (Syngo Via version: VA20A, Siemens AG, Erlangen, Germany) to independently and separately measure the shortest distance between the trigeminal nerve root and the responsible blood vessel.



To evaluate both intra- and interobserver agreement, they **measured the distance twice, with a 1-week interval.**

Statistical analysis

Statistical analysis was performed using IBM SPSS 21.0 software (New York, NY). Interobserver agreement regarding the **presence or absence of NVC** was evaluated by the k-coefficient.

k values	agreement
0-0.39	poor agreement
0.40-0.59	fair agreement
0.60-0.74	good agreement
0.75-1	excellent agreement

The intra- and interobserver agreements for the **distance** from the trigeminal nerve root to the responsible blood vessel were evaluated using the intraclass correlation coefficient (ICC).

ICC	agreement
0-0.2	slight
0.21-0.40	fair
0.41-0.60	moderate
0.61-0.80	substantial
0.81-1	almost perfect

The Mann-Whitney U test and the chi-square test were used to compare symptomatic and asymptomatic nerves in terms of the mean value and distribution, respectively, of the distance from the trigeminal nerve root to the responsible blood vessel.

RESULTS

-The interobserver agreement for the presence or absence of NVC was **excellent** (k=0.8534).

-For the measured distance from the trigeminal nerve root to the responsible blood vessel, the intraobserver ICCs for the two observers were **almost perfect** (0.903 and 0.936).

-The interobserver ICC was **almost perfect** (0.972).

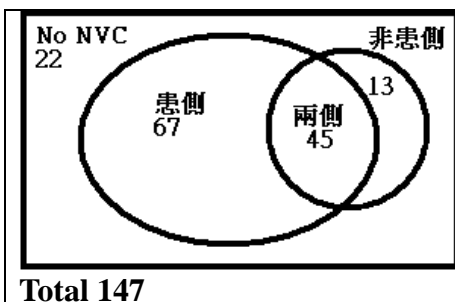


Table I. The presence or absence of neurovascular compression (NVC) in symptomatic and asymptomatic nerves

	Number of cases (%)	
	Symptomatic nerves	Asymptomatic nerves
NVC (+)	112 (76.2)	58 (39.5)
NVC (-)	35 (23.8)	89 (60.5)
Total	147 (100)	147 (100)

Table II. The responsible blood vessels in the cases with neurovascular compression

Responsible blood vessel	Number of cases (%)	
	Symptomatic nerves	Asymptomatic nerves
SCA	65 (58.0)	28 (48.3)
Vein	25 (22.3)	27 (46.6)
AICA	10 (8.9)	2 (3.4)
BA	5 (4.5)	1 (1.7)
PICA	3 (2.7)	
VA	1 (0.9)	
SCA and vein	1 (0.9)	
SCA and AICA	1 (0.9)	
BA and vein	1 (0.9)	
Total	112 (100)	58 (100)

造成 NVC 最主要的血管為 SCA(sup. cerebellar a.)

患側的 NVC 主要是動脈造成的 (87/112)

The mean distance in the **asymptomatic nerves** (3.85 ± 2.69 mm) was significantly greater than that in the **symptomatic nerves** (0.94 ± 1.27 mm)

Distance	Number of cases	
	Symptomatic nerves	Asymptomatic nerves
≤1 mm	71	11
1-2 mm	21	7
2-3 mm	11	3
3-4 mm	6	9
4-5 mm	2	7
>5 mm	1	21
Total	112	58
Mean distance	0.94 ± 1.27 mm	3.85 ± 2.69 mm

NVC of the nerves contralateral to TN symptoms was identified by Anderson et al. and Erbay et al. in 71% (34/78) and 25% (10/40) of cases, respectively.

Distance	Number of cases	
	Symptomatic nerves	Asymptomatic nerves
≤1 mm	71	11
1-2 mm	21	7
2-3 mm	11	3
3-4 mm	6	9
4-5 mm	2	7
>5 mm	1	21
Total	112	58
Mean distance	0.94 ± 1.27 mm	3.85 ± 2.69 mm

The rate of TN occurrence was 83.1% in cases with a distance of **3 mm or less** (103/124)

In 22 cases with a distance greater than 5 mm, all cases but one were **asymptomatic**

NVC was found in 46% (79/170) of the trigeminal nerves in asymptomatic subjects
 NVC was found in 39.5% (58/147) of asymptomatic nerves

DISCUSSION

There are **two main limitations** to our study.

First, the presence or absence of NVC was evaluated with MRI alone and **was not confirmed with surgery**. Although MRI findings are known to be highly consistent with intraoperative findings, it is possible that a few cases were misclassified with regard to the presence or absence of NVC.

Second, the patients included in our study **all had unilateral TN symptoms**, and we compared MRI findings on the symptomatic side with those on the asymptomatic side.

Further research will be necessary to confirm **whether the nerves in asymptomatic subjects show MRI findings similar to those of nerves**

contralateral to TN symptoms

CONCLUSIONS

-TN was closely related to the site where NVC occurred

-TN decreased significantly with distances greater than 3 mm and was rarely observed when it was greater than 5 mm.

題號	題目
1	關於三叉神經痛(trigeminal neuralgia)的診斷，下列何者為非？ (A) 通常來自輕觸到特殊或是經常性的觸發點(trigger point) (B) 通常很嚴重，偶發的，單次的陣痛期大於兩分鐘 (C) 受影響區域應在三叉神經的一個或多個分支，運動功能仍舊正常 (D) 使用 carbamazepine(Tegretol)後會明顯的消退
答案(B)	(陣痛期應在兩分鐘以下) 出處：Nevill 口病第三版
題號	題目
2	以下四種疾病在臉部疼痛位置及特性，何者為非？ (A) Trigeminal neuralgia：雙側，上顎或下顎；撕裂痛(lancinating) (B) Atypical facial pain：雙側，上顎；鈍痛(dull) (C) Migraine：臉部，特別是眼眶之上；搏動性痛(throbbing) (D) Cluster headache：後眼窩；單調性痛(boring)
答案(A)	(三叉神經痛通常為單側) 出處：Nevill 口病第三版