Acta Neurochir (2013) 155:477–478
DOI 10.1007/s00701-012-1614-8

LETTER TO THE EDITOR - NEUROSURGICAL TECHNIQUES

Venous complications in supracerebellar infratentorial approach

Asgeir S. Jakola · Jiri Bartek Jr. · Tiit Mathiesen

Received: 17 December 2012 / Accepted: 27 December 2012 / Published online: 12 January 2013

Dear editor,

The supracerebellar infratentorial (SCIT) trajectory is a standard approach to the pineal gland area. Sacrifice of tentorial bridging veins is usually necessary and considered unproblematic by most authors [1, 8]. However, we have experienced two postoperative complications following sacrifice of a limited number of bridging veins.

In the first patient, a pineocytoma was operated on in prone position and during the approach three out of four median veins were sacrificed, but without sacrifice of any veins in the hemispheric groups. Surgery was uneventful. The second patient had a pineal cyst that was operated on in three-quarters prone park-bench position. A paramedian approach was chosen between the vermian group of veins in the midline and one hemispheric vein. During the approach, only the hemispheric was sacrificed. No other veins were sacrificed in the approach or during extirpation of the cyst. Surgery was uneventful. Unexpectedly, complications occurred with a cerebellar swelling and an extensive venous infarction, respectively (Fig. 1).

A few papers imply that cerebellar swelling following sacrifice of a limited number of bridging veins can occur [2, 6]. Others simply describe that "it is better to save some of these draining veins, as occlusion of all of them may result in hemorrhagic venous infarction" [1]. As seen from our cases, dividing even a limited number of bridging veins may lead to unpredictable and severe complications in some patients. It is suggested from the literature that, although rare, venous complications following this approach may be underreported [10]. The discussion regarding the safety of sacrificing the superior petrosal vein is an interesting analogy. In original reports of large series cutting that vein was considered an initial key step in safe surgery [4]. More recently reports describe the rare occurrence of severe infarctions following sacrifice of the superior petrosal vein [3, 9].

The SCIT approach is very useful. However, given the unpredictable venous drainage and the surgical attitude that bridging veins can be sacrificed with impunity, venous related complications will occur. The clinical spectrum may be wide. Many patients describe self-limiting dizziness, headache and nausea that may in fact reflect milder venous related complications with venous stasis following venous sacrifice, but our cases show that severe complications, albeit rare, are also possible. Also, severe venous complications have been demonstrated with more extensive approaches that include infratentorial supracerebellar trajectory [7]. It would be interesting to see a prospective study with early postoperative MRI including diffusion-weighted sequences to better define the incidence of circulatory alterations following this approach and its relation to symptoms.

One may speculate that a sitting position minimize brain retraction and the interference with collateral venous flow after sacrificing of bridging veins [10]. On the other hand, it may

A. S. Jakola (✉)
Department of Neurosurgery, St. Olavs University Hospital, 7006, Trondheim, Norway
e-mail: asgeir.s.jakola@ntnu.no

A. S. Jakola
Department of Neuroscience, Norwegian University of Science and Technology, Trondheim, Norway

J. Bartek Jr. · T. Mathiesen
Department of Neurosurgery, Karolinska University Hospital, Stockholm, Sweden

J. Bartek Jr.
e-mail: jiri.bartek@karolinska.se

T. Mathiesen
e-mail: tiit.mathiesen@karolinska.se

J. Bartek Jr.
Department of Neurosurgery, Copenhagen University Hospital Rigshospitalet, Copenhagen, Denmark

also be speculated that ensuing hypotension and gravitational pull on the bridging veins constitute other risk factors.

One possible solution to minimize venous risks would be to plan the approach based on imaging of the venous circulation. With modern imaging techniques a detailed venous work-up in the posterior fossa is possible [5]. A tailored approach based on individual anatomy may in some instances lead to a different (e.g. supratentorial) approach, in spite of other risks of complications. Also, for some treatment goals other approaches, tools and modalities may be better options than the microsurgical approach.

In conclusion, division of even a limited number of bridging veins may lead to serious consequences in some patients. Increased awareness, a detailed preoperative work-up with emphasis on venous anatomy and meticulous efforts to avoid venous sacrifice may be important to minimize surgical risk.

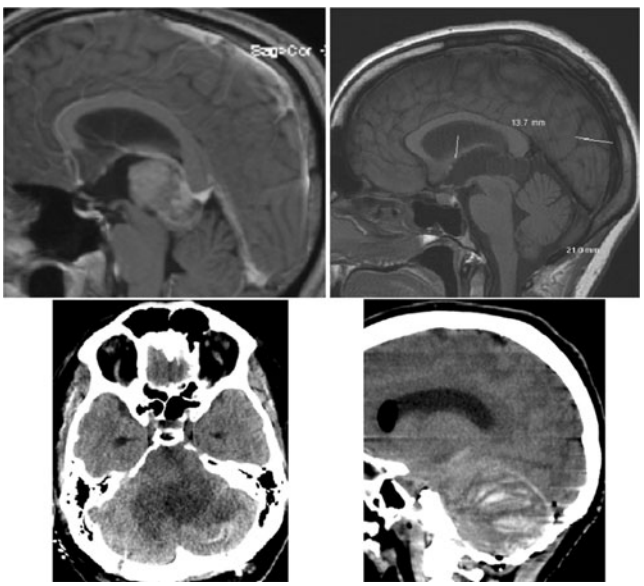

Fig. 1 To the *left*; pineocytoma preoperative MRI and postoperative CT. A significant swelling is seen on postoperative CT. To the *right*; pineal cyst seen on preoperative MRI and postoperative CT demonstrates hemorrhagic infarction

Conflicts of interest None.

References

1. Hernesniemi J, Romani R, Albayrak BS, Lehto H, Dashti R, Ramsey C 3rd, Karatas A, Cardia A, Navratil O, Piippo A, Fujiki M, Toninelli S, Niemela M (2008) Microsurgical management of pineal region lesions: personal experience with 119 patients. Surg Neurol 70:576–583
2. Kodera T, Bozinov O, Surucu O, Ulrich NH, Burkhardt JK, Bertalanffy H (2011) Neurosurgical venous considerations for tumors of the pineal region resected using the infratentorial supracerebellar approach. J Clin Neurosci 18:1481–1485
3. Masuoka J, Matsushima T, Hikita T, Inoue E (2009) Cerebellar swelling after sacrifice of the superior petrosal vein during microvascular decompression for trigeminal neuralgia. J Clin Neurosci 16:1342–1344
4. McLaughlin MR, Jannetta PJ, Clyde BL, Subach BR, Comey CH, Resnick DK (1999) Microvascular decompression of cranial nerves: lessons learned after 4400 operations. J Neurosurg 90:1–8
5. Oishi M, Fukuda M, Noto Y, Kawaguchi T, Hiraishi T, Fujii Y (2011) Trigeminal neuralgia associated with the specific bridging pattern of transverse pontine vein: diagnostic value of three-dimensional multifusion volumetric imaging. Stereotact Funct Neurosurg 89:226–233
6. Page LK (1977) The infratentorial-supracerebellar exposure of tumors in the pineal area. Neurosurgery 1:36–40
7. Piatt JH, Kellogg JX (2000) A hazard of combining the infratentorial supracerebellar and the cerebellomedullary fissure approaches: cerebellar venous insufficiency. Pediatr Neurosurg 33:243–248
8. Stein BM (1971) The infratentorial supracerebellar approach to pineal lesions. J Neurosurg 35:197–202
9. Tsukamoto H, Matsushima T, Fujiwara S, Fukui M (1993) Peduncular hallucinosis following microvascular decompression for trigeminal neuralgia: case report. Surgical neurology 40:31–34
10. Ueyama T, Al-Mefty O, Tamaki N (1998) Bridging veins on the tentorial surface of the cerebellum: a microsurgical anatomic study and operative considerations. Neurosurgery 43:1137–1145