Neurosurgical forum
Letters to the editor

Vertebral Artery Injury

To the Editor: We read with interest the report by Aota and coworkers (Aota Y, Honda A, Uesugi M, Yamashita T, Baba N, Niwa T, et al: Vertebral artery injury in C-1 lateral mass screw fixation. Case illustration. J Neurosurg Spine 5:554, December, 2006). We commend these authors on the honesty of their report and demonstration of a significant risk when placing posterior cervical instrumentation.

We would like to offer a few important technical comments that may help reduce the risk of this complication in posterior cervical fixation and in general all posterior fixation procedures involving the cervical spine, including the insertion of transarticular screws and lateral mass screws. Vertebral artery (VA) injury has been reported in association with almost every cervical procedure and may occur from direct or indirect injury.1,2,3 We have reported on a case of VA injury secondary to intraoperative cervical traction.4 Surgeons are aware that complications may occur in any case and, thus, preoperative surgical planning is of the utmost importance. Aota et al provided preoperative computed tomography (CT) scans demonstrating no abnormalities in the C-1 ring and also showing adequate size of the lateral masses. We also routinely perform preoperative CT scanning in all cases of cervical lateral mass or transarticular screw fixation to assess the foramen transversarium.5 The first line of defense in these cases of posterior cervical fixation is preventing a complication, and the second line of defense is knowing what to do if the complication occurs. Epstein6 reported on the appropriate management of intraoperative VA injury, which can include closure and embolization. A very important anatomical fact that we utilize in our cases and share with other surgeons and fellows is that, in the vast majority of patients, the left VA is the dominant artery, and thus the right-sided hardware must always be placed first. If there is a VA injury on the right, it will likely be less devastating than were it on the left. Depending on the type of injury on the right side, the surgeon may then decide to abandon the procedure or alter the surgery accordingly. One closing point worth discussion in cases of lateral mass screw fixation was raised in Seybold and associates’ cadaveric study7 on the optimum length of lateral mass screws. To assess the risk of neurovascular injury, they utilized cadavers and demonstrated that more than 92% of unicortical lateral mass screws were safely placed whereas only 68% of bicortical screws were safely inserted.8 Surprisingly, when comparing the pullout strength of the bi- and unicortical screws, they found no significant difference, which lent support to their conclusions that 11 mm of effective screw length is strong and safe.

In closing, we commend Aota and colleagues on their report and hope that our few technical suggestions can help surgeons reduce the risk of VA injury and, if an injury were to occur, limit the severity of injury by choosing the nondominant side as the initial fusion site.

Rob D. Dickerman, D.O., Ph.D.
Ashley S. Reynolds, R.N.
Neurosurgery Research Foundation of Texas
Plano Presbyterian Hospital
Plano, Texas
Brent C. Morgan, M.D.
North Texas Neurosurgical Associates
Plano, Texas
Jack Zigler, M.D.
The Texas Back Institute
Plano, Texas

References


Response: We wish to thank Dr. Dickerman and colleagues for their interest in our article as well as their additional comments. As they mentioned, VA injury continues to be a troubling complication of cervical instrumentation surgery.2,3,4 We read their letter with the greatest interest, especially the point about the “right-first” principle. Before undertaking posterior cervical instrumentation, we routinely evaluate the course of the VA using 3D CT angiography. On careful review of the angiograms obtained in 16 recently treated patients in whom posterior instrumentation was used, the VA was dominant on the left side in nine patients, on the right in four, and almost equal in size in three. Because anomalies of the VA are often associated with cervical spine disorders,9 presurgical angiographic evaluation is considered to be mandatory. We agree with Dickerman and colleagues that screws should be placed on the less dominant side first.

To comment on Dickerman and colleagues’ discussion of the optimum length of lateral mass screws, our procedure never allows the screw to penetrate the anterior cortex when applying C-1 lateral mass screws for fear of causing an internal carotid artery injury or hypoglossal nerve palsy.5 However, it is possible to use a long enough
screw without penetrating the anterior cortex. In contrast, in the subaxial spine the lateral mass screws used must be relatively short. Biomechanical postfixation stability depends on bone quality and the instability of the lesion. We routinely penetrate two cortical layers during lateral mass screw fixation and four cortical layers during transarticular screw fixation.1,4,8 Thus far, with these procedures, VA injury has never been caused. The target area in our procedures is at the juncture between the transverse process and the facet joint, which An et al.1 considered to be the safest for the VA and nerve roots. The spinous processes usually interfere with proper positioning of the drill in the lateral direction.3 To achieve a better alignment of the drill, a spinous process–splitting approach, developed by Shiraishi,7 is highly recommended. (DOI: 10.3171/SPI-07/07/113)

YOSHI AOTA, M.D.
ATSUSHI HONDA, M.D.
MASAHI UESUGI, M.D.
TAKAYUKI YAMASHITA, M.D.
NORIYUKI BABA, M.D.
TOMOYUKI SAITO, M.D.
Yokohama City University Hospital
Yokohama, Japan

References


Disc Cyst

To THE EDITOR: In an interesting article by Chou and associates (Chou D, Smith JS, Chin CT: Spontaneous regression of a disc cyst. J Neurosurg Spine 6:81–84, January, 2007), the authors reported on the spontaneous regression of a disc cyst at 5 months, although they also acknowledged one previous un heralded report.2

Abstract

The authors describe a case of a discal cyst that resolved almost completely without direct intervention. Discal cysts are rare, with the authors of only a few case reports describing this entity. These reports all identify at least some intervention performed for alleviation of the symptoms, including open surgery, minimally invasive surgery, or percutaneous puncture with aspiration. The authors report on a 35-year-old man with radiculopathy who presented with a discal cyst and was treated with a routine epidural injection and selective nerve root block. Within 5 months, the discal cyst showed dramatic regression on magnetic resonance imaging and the patient’s symptoms improved. The natural history of this pathological entity is unknown, and to the authors’ knowledge this is the first detailed report of the regression of a discal cyst without surgery or aspiration.

Because Chou et al. introduced steroids into the extradural space via both a sacral epidural injection and a nerve root block, they also acknowledged the case reported by Koga et al.3 in which an intracystic steroid injection may have provoked spontaneous regression. As my colleagues and I have demonstrated in a literature review,4 however, “disc cysts” are not (as suggested by Chiba et al.1) a novel entity but, instead, are probably synonymous with ganglion cysts of either the posterior longitudinal ligament (PLL) or anulus fibrosus (AF). The only apparent novelty is that disc cysts display cyst–disc communication. However, in the same way that one does not usually distinguish joint-communicating wrist ganglions from those that do not communicate with the wrist, no particular advantage can be seen in similarly distinguishing disc cysts.4 Assuming, then, that disc cysts are like ganglions, spontaneous regression would not be anomalous but, rather, expected because up to 40% of wrist ganglions spontaneously resolve within 6 years.5 The fact, however, that spontaneous regression appears rare with disc or AF/PLL ganglion cysts is just one of several anomalies encountered with these entities that we outlined in our previous article (Table 1).

One pertinent anomaly is that if all such intraspinal cysts are merely ganglions, postoperative recurrences should also be more common. Thus, despite wrist ganglion recurrence rates of 34% (typically within the 1st year),6 no recurrences have yet been reported in cases of disc or AF/PLL ganglion cysts.4 This is particularly interesting given the fact that, unlike juxtapacetal ganglion excision, the adjacent joint (that is, the intervertebral disc) rarely has been excised (or even entered).4 One other pertinent anomaly relates to the overwhelming bias noted in young males with disc or AF/PLL ganglion cysts (Table 1). It would be interesting to see if all ectopic (that is, nonsynovial) ganglions displayed similarly anomalous characteristics.

As in our cases,4 Chou et al. did not consider discography in the management of their case. Assuming that all such cysts are merely ganglion cysts, discography would only provide added value when one is considering removing the adjacent disc as a potential source of chronic discogenic pain; however, as we showed, the adjacent