Expert's comment concerning Grand Rounds case entitled “Temporary occipito-cervical stabilization of an unilateral occipital condyle fracture” (by Klaus John Schnake, Andreas Pingel, Matti Scholz and Frank Kandziora)

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The authors [1] present an interesting case of a 29-year-old male following a road traffic accident. There was a mild closed head injury, a C7 burst fracture with incomplete C7 root weakness, and a unilateral minimally displaced occipital condyle fracture.

Some interesting management choices were made.

The presence of the incomplete radiculopathy was used as an indication for immediate surgery although the exact time from injury to surgery is not stated. A posterior approach was chosen where extensive instrumentation from C5–T2 was performed, although the fusion process was limited to C6–T1. It is reported that the patient regained normal neurological status post-operatively, but whether this was immediate is unclear.

Four days later, the patient was taken back to theatre where an anterior corpectomy was performed, expansile cage placed and secured with a plate. The patient was then

turned and the posterior wound reopened. C0–C3 was fixed but not fused.

Subsequently the C0–3 construct and C5 screws were removed.

I find the surgical management somewhat excessive.

The issue of urgency of surgery is debatable. In the context of spinal cord injury with incomplete neurological function and persistent thecal compression, one would generally operate as early as safely possible although the clinical evidence is not conclusive. In this case, there was no cord injury but single root weakness. In all likelihood, the root had been contused in the traumatic incident. I am unconvinced that immediate surgery would be of value, especially if it places the patient at additional risk. It is a lower motor lesion and likely to improve. It appears that this urgency may have resulted in delayed definitive management of the patient, necessitating the return to surgery 4 days later.

The choice of the initial surgery is also debatable. Posterior surgery requires prone positioning of the patient and increases the risk of secondary injury. For this reason I favour anterior cervical surgery in unstable scenario's (when possible). This allows the patient to be positioned on the operating table awake, confirming neurological integrity before induction of anaesthesia. One may argue that root decompression in this case would be more reliably done from anterior. In my hands, cervical burst fractures are adequately managed with anterior corpectomy and plating with fixed axis screws. Most of the trauma patients are young men with good bone providing excellent purchase. Intra-operatively, a call can be made based on the screw-bone fix judged by the torque required to insert the screw. Although subjective, one develops a feel for this. I prefer the use of tricortical iliac crest graft rather than a cage in these cases, as union is easily visible on follow-up

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X-rays. The morbidity of anterior iliac crest harvest is overstated and a biological solution is preferable in young patients with a normal life expectancy (as opposed to tumour).

This C7 burst is a little more complex as the right facet appears comminuted on the axial CT. The authors state that they interpreted the fracture as rotationally unstable. This being the case, one can understand the choice of a 360° fixation. However, my preference would have been an anterior decompression and instrumented fusion possibly followed by a posterior support if I felt the plate fixation inadequate. To extend the posterior instrumentation from C5 and T2 is unnecessary in my opinion. When combined with anterior plating, single level instrumentation is sufficient.

Although the authors state that the fusion was limited to C6–T1, this is difficult to control. The cervical spine fuses readily and by exposing the C5 and T2 posterior elements for instrumentation, one is likely to see extension of the fusion to these levels.

Do Koh [2] reports on a biomechanical cadaver-based comparison between anterior plating, posterior lateral mass plating and combined methods. They found posterior plating with anterior interbody grafting to be effective and better than either anterior or posterior fixation alone. They concluded that anterior and posterior instrumentation did not significantly increase stability over posterior plating and anterior graft.

Spivak [3], in another cadaver-based study, showed that anterior plating alone was able to restore the stability of the cervical spines with posterior ligamentous injury after corpectomy, but it failed to do so with the addition of bilateral facetectomies.

Fisher [4] reported on a clinical series of teardrop fractures comparing Halo vest to anterior corpectomy and plating. He recommended the use of anterior plating. Although better than Halo vest, the plating group had an average residual kyphosis of 3.5°.

Barros Filho [5] managed 68 quadriplegics with corpectomy, iliac bone grafting and anterior plating in an older study. They recommended this as an effective technique with only one case requiring revision for loose screws.

The management of the occipital condyle fracture intrigues me. These are rare fractures and probably frequently missed unless CT investigation is routinely employed. Mueller [6] reports a series of 2,616 cervical CT scans at level 1 trauma hospital. They had a 1.19 % incidence of occipital condyle fractures. In the 5-year period, they identified 31 patients with 35 occipital condyle fractures. Only three were associated with atlanto-occipital dissociation (AOD). They managed to rescan 70 % of these patients 1 year later (5 not surviving their polytrauma injuries). They found that there was no 2° displacement with all, but one demonstrating bony consolidation. This one had 4 mm displacement at the time of injury.

They managed all non-AOD injuries with a rigid collar. They concluded that these injuries are stable unless associated with AOD and should be managed non-operatively.

The reason the presented case was instrumented from C0–3 was based on the mild atlanto-axial rotation (22°) as demonstrated in their axial CT's. This is well within the normal range of motion and is likely to have been due to an extrinsic cause, possibly muscle spasm. I would have thought simple cervical traction would have sufficed and a collar applied. Chou [7] reported on such a case where a patient developed torticollis after a head injury. The CT identified an occipital condyle fracture, which was managed with traction followed by Halo immobilisation with a good result. Karam [8] confirms conservative care as the management of choice unless atlanto-occipital instability is present in a review of current literature.

Again, although fusion was not intended, exposure of the occiput and vertebral posterior elements can result in spontaneous fusion.

This interesting case highlights the dangers of over exuberance. Although there are many ways to skin a cat, we as surgeons must avoid being caught up with what we can do. We must concentrate on what we should do and manage patients with a clear understanding of risk and benefits.

Although the patient is no doubt grateful for the well-intended care, one feels this case could have been successfully managed far simply.

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