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REVIEWER'S COMMENT

Debate continues on the clinical effectiveness and safety of pedicular screw fixation for spinal disorders. In this contemporary study, the authors have found that plain radiographs were unreliable to detect correct pedicle screw positioning and that interobserver variance in interpreting the radiographs was considerable. Although these findings are well supported by the data provided, this investigation necessitates some comments to avoid misunderstandings and misinterpretation of the data.

The fact that 80 out of 119 screws (67%) have perforated the pedicle or the vertebra should rise some con-

cerns on the safety of these implants. Pedicle screws can jeopardize neural structures particularly when they perforate the pedicle at its medial and inferior border, because of the existing nerve root. In this study, 15 screws (13%) violated the pedicle, six of those perforated at the medial or inferior border. Only one screw was out of the pedicle for more than 4 mm which occurred at the lateral border of the pedicle where neural compromise is less frequently found. The authors did not observe any neurological compromise which suggests that minor perforations of the pedicle (<2 mm) remain without clinical consequences.

The most frequent perforation site was anterior, where 65 screws (55%) violated the anterior cortex. At this site, penetrating screws can lacerate the great abdominal vessels which would present as a disastrous complication. As mentioned in the paper, screw placement through the anterior cortex is often intentionally performed in the light of an increased pull-out strength. However, a perforation of more than 4 mm which occurred in 13% was most likely not intended by the surgeons. Although there is in general a safety margin of about 5–10 mm, the surgeon should be well aware that the penetration depth of the screw can

easily be misinterpreted when checking with X-ray techniques or even by a computer guidance system.

The data of this study clearly demonstrate that malpositioning of pedicle screws is more frequently found than surgeons might anticipate. Although none of these misplaced screws had a clinical relevance, one should not conclude that pedicle screw fixation is without hazards for the patient. A meticulous technique and surgical experience is absolutely necessary with these devices.

The vast majority of the pedicle screws in this study has been inserted by a computer assisted guiding system. A misplacement rate of 67% with such a system is somewhat unexpected and

astonishing. However, the study design focused on the reliability of radiographic pedicle screw assessment and not on an evaluation of the clinical efficacy of such guiding systems. A conclusive assessment is therefore not possible and the reader is warned not to misinterpret the data.

The clinical relevance of this paper lies in the finding that standard radiographs are unreliable in determining the correct position of pedicle screws. In cases necessitating a reliable postoperative assessment of pedicle screws, computed tomography should be performed as the image modality of choice. But even computed tomography is prone to inherent errors because of implant re-

lated artifacts (e.g. obscuring the borders of the pedicle). But this factor was not incorporated in the study design. In cases of postoperative complications theoretically attributable to a misplaced pedicle screw, an aggressive diagnostic approach is strongly recommended including re-exploration of the screw, screw hole and nerve roots because pedicle screw perforation is a frequent finding as demonstrated in this study.

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