Further opinion

A radiological study to define safe zones for drilling during plating of clavicle fractures
A. Sinha, J. Edwin, B. Sreeharsha, V. Bhalaik, P. Brownson

Sinha et al investigated the anatomical relationship of the clavicle and their adjacent subclavian vascular structures. They used 3D CT-arteriogram and produced nice sagittal reconstructions of the anatomy in 26 individuals.

Surgical interventions for clavicular fractures have become more frequent since we understood that malunion leads to unfavourable results more often than we previously thought. Plate fixation is the gold standard but intramedullary pins are also used, especially in simple fractures. Infection and non-union are the most common complications of these interventions.

It is well known that vascular sequelae caused by malunion or hypertrophic callus formation after conservative treatment of clavicular fractures can result in thoracic outlet syndrome. Reports of iatrogenic damage to the vessels are very rare.1,2 Probably there are more cases which have not been published. We clearly have to know about the structures at risk as precisely as possible to prevent any harm to the patient. Of course we have to be especially aware of major nerves and vessels. At other locations like the elbow or the knee, if necessary we even mobilize and/or protect these structures with hooks. In clavicular fractures nerves and vessels are invisible on the other side of the bone. We just have to know, where they are.

Singa et al clearly visualised, that in the medial one third the vessels are definitely posterior to the clavicle. We learned that there is special risk to the subclavian vein, as it can be in direct contact to the bone of the medial clavicle. Any perforation of the posterior cortex by drilling, tapping and especially by intramedullary nails must be avoided.

We learned, that in the middle one third the vessel can also be as close as 5 mm to the bone. Unfortunately, the authors still have to leave some uncertainty regarding the exact position of the vessels. In general they are to be expected rather caudal than posterior, but in some individuals they are immediately posterior or straight caudal to the bone. Interestingly both published cases of iatrogenic injury to the vessels1,2 occurred in the middle one third.

We learned further, that in the lateral one third we do not have to care about the subclavian vessels.

In conclusion for my daily work it was confirmed that I am right to choose the cranial position of the plate in clavicular fractures. Thus I can avoid any threat to the posterior cortex of the medial one third. In the middle one third I will be more careful when drilling and tapping than I was before, since I can never be sure, where and how close the vessels might be. I will aim for an accurate cranial position and avoid any posterior inclined trajectories. Furthermore I will be very cautious when working on the medial one third for insertion of an antegrade nail to prevent the violation of the posterior cortex.

Dr Andreas Klonz,
ATOS Klinik Heidelberg,
Heidelberg, Germany,
klonz@atos.de

References

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