Editorial

Why do we operate proximal humeral fractures?

In this issue of *Acta Orthopaedica*, we have a systematic review of randomized trials on proximal humeral fractures by Launonen et al. They report on 6 trials involving 588 patients that compared surgery with nonoperative treatment, and conclude that the trials did not provide any evidence that surgery is superior. After this paper was accepted, the basis for decisions regarding proximal humeral fractures suddenly increased to 819 patients studied in reasonable randomized trials. The new data agree with the conclusions of Launonen et al. They appeared through a large randomized trial with blinded evaluation, published in JAMA, in which surgery was compared to nonoperative treatment in 231 patients with proximal humeral fractures of different types (Rangan et al. 2015). The inclusion criteria were wide, so as to reflect clinical practice. Surgery involved the use of prostheses or locking plates. The results, as measured with the Oxford shoulder score, showed no clinically meaningful difference in outcome. Post hoc analysis could not find any influence of age or fracture type on the outcome. 313 patients refused to participate in the study, the majority because they preferred nonoperative treatment; only 55 of them preferred surgery (Rangan, personal communication). All the details of the study have been published separately (Handoll et al. 2015). The authors conclude that the recent increase in the number of surgically treated patients with proximal humeral fractures is unwarranted.

So, once again, there is a large, well-performed trial showing that a common orthopedic procedure is of little or no value. Considering that the strong placebo effect of surgery had not made the patients who were operated on feel better than controls, one could even suspect that the "true" effect of surgery is negative. How will the orthopedic community receive this? I fear that the enthusiasm for the idea that operations can be avoided might be limited, in spite of the fact that surgical resources can be set free and put to better use.

Due to the nature of science, it is impossible to "prove" that something doesn't work. Thus, anyone who has a strong belief in a procedure can always claim that a study failed to take important concepts into consideration. Usually, a particular type of operation that the critic prefers was not performed: "Of course they got poor results: they can't operate". Similarly, most (male) car drivers think that they are better drivers than average. Other opponents take the position that the burden of proof lies with those who claim that surgery is unnecessary. This position might seem absurd; but on the other hand, if one compares a nice postoperative radiograph with a preoperative mess, it might seem understandable. Now, statistics speaks against it.

A fracture is an obvious threat to a patient, and in threatening situations we take chances. A choice between 2 bad alternatives often leads to risk-seeking behavior (Kahneman and Tversky 1979). There is a general perception that fracture surgery is a gamble with a great chance to avoid loss, at the cost of a small risk of complications. Suppose that a surgeon claims that nonoperative treatment will lead to a certain loss of function, albeit small. If he operates, there is a good chance of full restoration. He estimates the loss after nonoperative treatment to be 5% of function, and the risk of surgical complications (leading to 50% loss of function) to be 12%. Because certain loss tends to be more repulsive than a risk, many people would take the gamble and prefer surgery, despite the fact that mathematically it is the inferior alternative. But as surgeons, we should keep our heads cooler than that. Risk seeking could be psychologically motivated in individual cases, but for all our patients taken together it would lead to overall loss. In Rangan's study, however, it seems that surgical and non-surgical treatment were associated with similar risks: the distribution of Oxford shoulder scores was similar, and 11 patients required secondary surgery in both groups.

In summary, no convincing benefit of surgery has been shown for proximal humeral fractures, despite several attempts involving many hundreds of patients in randomized trials. Psychological mechanisms could make it difficult for us to accept it, but these are the data we have, and data should affect treatment decisions.

It is difficult to argue against the conclusion of Launonen et al. and Rangan et al. that the recent increase in surgery on proximal humeral fractures is unwarranted.

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