

## Editorial

# Biological Augmentation in Rotator Cuff Repair: The Real Challenge for the Future of Shoulder Surgery

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In this issue of *Joints*, we publish an interesting article by Castagna et al from the Humanitas Research Hospital in Rozzano (Milan), Italy, entitled “Porcine dermal xenograft as augmentation in the treatment of large rotator cuff tears: clinical and magnetic resonance results at 2-year follow-up.”<sup>1</sup>

At 2 years, the authors of this retrospective comparative study, involving 70 patients, observed a significant improvement in the clinical and functional conditions of the patients treated with a porcine dermal patch graft, as shown by their Constant score and by an approximately 11% lower retear rate in this group (21.9% vs. 33.3% in the group receiving standard treatment). Although this difference did not reach statistical significance, it is worth highlighting its clinical significance. This study probably lacked sufficient power to show a statistically significant effect of the experimental treatment, especially on the outcome “retear” which, being a dichotomous variable (yes/no), would require a much larger sample. Nevertheless, when a new treatment proves capable of producing an almost 11% greater reduction of the risk of recurrence compared with a standard treatment, I would say that the clinical importance of this result deserves to be analyzed, especially given the considerable implications of this study’s topic in terms of societal costs.

Today, many countries are experiencing a huge increase in the demand for health care services related to the treatment of orthopaedic conditions; this is partly because the average age of the population is rising, and partly an effect of increasing functional demands, even among the elderly. This phenomenon is being accompanied by a strong tendency to choose surgical solutions for most of these problems, a trend driven partly by the interests of producers of biomedical devices and partly by the mechanisms currently in place, in both public and private health care systems, for the reimbursement of surgical interventions.

Therefore, whereas, on the one hand, vast resources are being invested in the study and prevention of both general and specific health-related problems of aging, leading to

important developments in the field of regenerative medicine, and in joint preservation surgery (as opposed to conservative treatments), and on the other, we are seeing an increasingly strong movement toward replacement (prosthetic) surgical solutions that apparently guarantee shorter recovery times and lower societal costs, but undoubtedly also translate into higher revenues for the manufacturers of these devices and also for surgeons.

A study from a few years ago,<sup>2</sup> which analyzed the mean societal impact of repair versus conservative treatment of rotator cuff tears, found that rotator cuff repair for symptomatic full-thickness tears produces net societal cost savings for patients under the age of 61 years. However, rotator cuff repair seems to lead to significantly improved quality of life in older patients, too; from this perspective, it is important to note that older age has been found to show a modest negative effect on cuff integrity, but no significant effect on function.<sup>3</sup>

In cost-effectiveness analysis studies of arthroscopic rotator cuff repair versus reverse total shoulder arthroplasty for the treatment of massive rotator cuff tears, some authors<sup>4,5</sup> demonstrated that primary arthroscopic rotator cuff repair with conversion to reverse total shoulder arthroplasty on potential failure was the most cost-effective strategy, independently of age.

This information shows that repair surgery should remain the first line of treatment for rotator cuff lesions, even ones at high risk of recurrence. From this perspective, biological augmentation techniques, such as the use of patch grafts, growth factors, mesenchymal stem cells, or combinations of these, emerge as the real challenge for the future. And it is a challenge to be pursued despite the views of more superficial analysts (some of whom may have vested interests), who consider the costs associated with longer operative times, biological devices, and longer postoperative recovery times to constitute indisputable disadvantages of these approaches compared with prosthetic surgery. However, what they overlook is the potentially high (societal) cost of this latter treatment option. In fact,

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although it allows quick and generally safe recovery of function, it carries the risk of a huge future increase in costly and frustrating revision surgeries.

#### Conflict of Interest

None declared.

#### References

- 1 Castagna A, Cesari E, Di Matteo B, et al. Porcine dermal xenograft as augmentation in the treatment of large rotator cuff tears: clinical and magnetic resonance results at 2-year follow-up. *Joints* 2018;6(03):135–140
- 2 Mather RC III, Koenig L, Acevedo D, et al. The societal and economic value of rotator cuff repair. *J Bone Joint Surg Am* 2013;95(22):1993–2000
- 3 Raman J, Walton D, MacDermid JC, Athwal GS. Predictors of outcomes after rotator cuff repair-a meta-analysis. *J Hand Ther* 2017;30(03):276–292
- 4 Makhni EC, Swart E, Steinhaus ME, et al. Cost-effectiveness of reverse total shoulder arthroplasty versus arthroscopic rotator cuff repair for symptomatic large and massive rotator cuff tears. *Arthroscopy* 2016;32(09):1771–1780
- 5 Dornan GJ, Katthagen JC, Tahal DS, et al. Cost-effectiveness of arthroscopic rotator cuff repair versus reverse total shoulder arthroplasty for the treatment of massive rotator cuff tears in patients with pseudoparalysis and nonarthritic shoulders. *Arthroscopy* 2017;33(04):716–725