

## Editorial – “Spine-in-spine”: few considerations regarding the so-called “Spinal transplant”

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To the Editor and to the readers of the European Review for Medical and Pharmacological Sciences. In the last few weeks it was reported by the news of the first spinal transplant ever which was performed at our Institution.

The aim of this brief Editorial is to report the preliminary details regarding the performed procedure. The case was that of a 77 years old men affected by a T12 chordoma which had already been submitted to a previous intralesional procedure (decompression and incisional biopsy). His only complaint was back pain, and physical examination did not reveal any neurological deficit. The treatment suggested was en bloc resection and adjuvant radiation therapy with heavy particles due to the previous contamination. To maximize its effectiveness, complete radiolucency of the hardware is advised<sup>1</sup>. Thus, the option of replacing the resected specimen with allogenic vertebral bony graft was combined with posterior carbon fiber-reinforced poly-ether-ether-ketone screw rods in order to achieve a completely radiolucent construct. The procedure took place on September 6<sup>th</sup> and lasted 10 hours. A double approach (Type 3: A+P<sup>2</sup>) was performed to resect T12 along with the adjacent discs and a slice of the adjacent vertebral bodies achieving a focally intralesional margin at the canal (while wide on all the other surfaces). Being this an Enneking-Inappropriate (EI) resection ab initio for previous margin contamination, 30 Gy (RBE) proton-therapy was given 2 months later. The post-operative and early rehabilitation courses were uneventful, but this cannot significantly be credited only to the reconstruction technique.

The possibility to choose a structural cortico-cancellous vertebral bone graft instead of a long bone diaphysis (i.e., femoral or tibial) was allowed by our local bone bank which upon request harvested vertebral bone graft in addition to the standard protocol which includes long bones of the limbs, hemipelvis (or iliac crest), and several tendons.

The rationale to support reconstruction of a bone loss with a bony segment of analogous origin is self-evident. In fact, not only this can be prepared to fit the length of the loss, but it is even more close to the original volume of the resected specimen. Moreover, the presence of cancellous bone is expected to promote integration, when compared with cortical-only grafts<sup>3</sup>. Vertebral body grafts are by nature modular and several elements can be combined and fixed together. Another potential advantage could be the presence of the pedicles which allows placement of screw to connect the anterior reconstruction to the posterior instrumentation without any risk to fracture the graft.

Several options already exist for anterior column reconstruction each with a peculiar profile of advantages and weaknesses with which spine surgeons must be familiar. Although strong evidences still lacks<sup>4</sup>, any technique must restore weight-bearing capacity of the anterior column and provide rationale expectation of fusion (or osteointegration) in order to increase likelihood of long-term success. Use of allograft has the theoretical risk for disease transmission, but strict protocols exist for complete screening of both donors and grafts.

This reported technique is just another option for using a cortico-cancellous homologous bone graft for anterior spinal fusion that I feel could have great potentiality, although longer follow-up will be needed.

### Conflict of Interest

The Authors declare that they have no conflict of interests.

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### **References**

- 1) TEDESCO G, GASBARRINI A, BANDIERA S, GHERMANDI R, BORIANI S. Composite PEEK/Carbon fiber implants can increase the effectiveness of radiotherapy in the management of spine tumors. *J Spine Surg* 2017; 3: 323-329.
- 2) BORIANI S. En bloc resection in the spine: a procedure of surgical oncology. *J Spine Surg* 2018; 4: 668-676.
- 3) SMITH MD, CODY DD. Load-bearing capacity of corticocancellous bone grafts in the spine. *J Bone Joint Surg Am* 1993; 75: 1206-1213.
- 4) GLENNIE RA, RAMPERSAUD YR, BORIANI S, REYNOLDS JJ, WILLIAMS R, GOKASLAN ZL, SCHMIDT MH, VARGA PP, FISHER CG. A systematic review with consensus expert opinion of best reconstructive techniques after osseous en bloc spinal column tumor resection. *Spine (Phila Pa 1976)* 2016; 41 Suppl 20: S205-S211.