length of stay of 18 ± 16 days after chest wall reconstruction using mesh. Indeed, a lack of postoperative chest wall rigidity could lead to paradoxical chest motion with acute respiratory failure, difficulty in weaning the patient from the ventilator and a high risk of pneumonia. The rigidity of the chest wall cavity must be restored in order to diminish the number and severity of complications. In this context, large chest wall resections with low postoperative risk have become possible, since titanium bars attached between ribs can sufficiently rigidify the chest wall [3, 4]. However, bars did not protect the heart from external trauma as custom-made titanium plate could do. However, when a custom-made titanium plate is used instead of bars, it better protects the heart from external trauma. Titanium is a biocompatible, inert material, malleable enough to allow a custom-made design reproducing the shape of the sternum and the chest wall. Moreover, without compromising rigidity, holes were added to the plate surface so as to avoid seroma, which is a source of infection. At least, titanium does not interfere with computed tomography or magnetic resonance imaging during the postoperative follow-up.

CONCLUSION

In conclusion, this new material for sternal reconstruction may extend the existing range of indications of sternectomy for cancer with curative intent with lower postoperative risk compared with the reconstructive materials that have already been used. The long-term follow-up result will be useful to define this technique as the conventional surgical reconstruction after sternal resection.

Conflict of interest: none declared.

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eComment. Multiple strategies for sternal reconstruction

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I read with great interest the paper by Demondion *et al.* [1], in which they describe a novel technique to replace the sternum by a custom-made titanium plate in a 28-year old female patient. Complete sternal resection is an established and universally accepted method for the treatment of primary sternal tumours. However, it remains questionable in the setting of direct malignant infiltration from adjacent invasive tumours or metastasis of different types of cancer. Robust data are lacking to confirm the advantages of local sternal palliation over risks of an extended and debilitating procedure [2].

As rightly outlined by the authors, the ideal prosthesis to replace the sternum should be rigid to protect the heart, malleable to accommodate breathing and inert to allow in-growth of fibrous tissue and decrease the likelihood of infection. Nevertheless, the extensive range of clinical and experimental investigations in the literature for sternal reconstruction denotes the unanswered nature of this problem [3]. Multiple surgical techniques have been used, involving different materials for sternal replacement. However, none of them have gained widespread acceptance. The simplest solution remains the use of Marlex mesh or a polytetrafluoroethylene, combined with soft tissue coverage. This is of particular interest in case of partial sternectomy. Reinforcement with rigid prostheses such as methyl methacrylate or metallic plates to avoid anterior flail chest and to protect mediastinal organs, is recommended specially in case of total sternal resection [4].

Recently, Dell'Amore *et al.* [5] described another innovative technique for sternal reconstruction. They successfully performed sternal allograft transplantation in four patients. After a special allograft conditioning, the transplant is appropriately tailored to fit into the chest defect. Titanium plates and locking screws are used to fix the allograft to the adjacent ribs. Pectoralis muscle flaps are used as soft tissue coverage in the final step of sternal replacement. Bone allografts act as a scaffold for cells and bone formation, allowing an excellent host tissue incorporation with very low risk of infection. However, the major drawback of this promising technique is the lack of long-term outcomes.

Conflict of interest: none declared.

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