Extraction of substernal goitre using an innovative vacuum device

Pierre-Yves Brichon*, Paolo Porcu, Alexandre Moreau-Gaudry and Dominique Blin

* Department of Thoracic Surgery, University Hospital of Grenoble, Grenoble, France
b Department of Cardiac Surgery, University Hospital of Grenoble, Grenoble, France

* Corresponding author. Department of Thoracic Surgery, Hôpital University Hospital of Grenoble, La Tronche 38700, France. Tel: +33-476765461; fax: +33-476765185; e-mail: pybrichon@chu-grenoble.fr (P.-Y. Brichon).

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Abstract

The extraction by cervicotomy of substernal goitres may be impossible and sometimes requires the enlargement of the thoracic inlet with at least a sternal-split. We present the extraction of a posterior mediastinal substernal goitre with the application of an innovative vacuum-based suction device, previously used for the control of bleeding from the heart and great vessels in clinical and experimental conditions.

Keywords: Substernal goitre • Medical device • Vacuum

The extraction by cervicotomy of substernal goitres entails the crossing of the endothoracic part through the thoracic inlet. This crossing may be impossible and sometimes requires the enlargement of the thoracic inlet with at least a sternal-split. Furthermore, excessive traction on a poly-lobed goitre exposes it either to a tear with massive bleeding and operative difficulty or to leaving some residual thyroid tissue. In the latter case, the residual tissue may lead to the so-called ‘residual or forgotten goitre’. Finally, attempts at picking the lower pole of the endothoracic part by a finger or any instrument risks possible damage to the surrounding structures, particularly the lower laryngeal nerves whose path can be very lateralized by the volume of the goitre. While most intrathoracic goitres are removed by a cervicotomy (Kocher transverse collar incision), nearly 5–25% of cases require a full sternotomy or a sternal-split that increases the gesture, risks postoperative pain and lengthens hospitalization [1]. This may occur specially in the case of posterior migration [2]. One of the authors recently developed a sucker craft used for the haemostasis of wounds of solid organs and especially the heart and great vessels [3]. This vacuum seemed useful for the extraction of endo-thoracic goitre.

Clinical case: a 69-year old man had a goitre with a nearly separated intrathoracic posterior development (Figs 1 and 2). By cervicotomy, and after release of the upper pole of the right thyroid lobe, two suction cups were applied (one on each side) and allowed the extraction of the mediastinal part (Supplementary Video 1).

Figure 1: CT scan showing the posterior extension of the substernal goitre.

Figure 2: Total thyroidectomy with a nearly independent intrathoracic extension.

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The material presented is either a flat and long or a semi-hemispherical silicone device, connected to a vacuum system. Designed for haemostasis, the device includes a double chamber; but, for the goitre extraction, the central chamber is unnecessary and can be removed. A team has recently used a starfish heart positioner to promote the separation of a large mediastinal tumour from other structures within the chest [4]. The advantage of our device is its low cost and the ability to be positioned further along the tumour because it is very flat and applies a tangential traction. Furthermore, it seems specially useful when, as in our case, the mediastinal component is almost completely separated from the thyroid. Finally, several devices can be inserted at different times of the surgical procedure to allow a very slow and progressive extraction of the goitre. It could also be used for grasping other tumours.

SUPPLEMENTARY MATERIAL

Supplementary material (Video 1) is available at EJCTS online.

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REFERENCES