TRANSPOSITION OF SERRATUS ANTERIOR AND INTERCOSTAL FLAPS ASSOCIATED WITH 5 RIBS THORACOPLEUROPLASTY FOR A GIANT APICAL TB CAVITY WITH LARGE BRONCHIAL FISTULA

SUMMARY:
We present a 28 years old patient, diagnosed with pulmonary TB 6 years ago. He presents a giant apical TB cavity with large bronchial fistula and absolute contraindication for pulmonary resection on functional criteria (VC 28%, FEV1 31%). Surgery consisted in an association of a Boțianu thoracopleuroplasty with serratus anterior transposition and use of two intercostal flaps – one for closure-reinforcement of the bronchial fistula and one for filling the cul-de-sac located below the first rib. Postoperative course was difficult but eventually favourable, including a slight improvement of the respiratory functional tests (VC 41%, FEV1 46%). The case is interesting due to the combination of procedures used to obliterate the TB cavity and shows the usefulness of the serratus anterior muscular flap for solving of intrathoracic defects.

Key words: apical TB cavity, intercostal flaps , serratus anterior

INTRODUCTION

Despite being used with good results in plastic and reconstructive surgery (1, 2) the serratus anterior is usually presented as a less usefull flap in general thoracic surgery. This attitude is due mainly to some reticences for its use in chest wall reconstruction (3), which are related to the poor and variable blood supply of the skin overlying this muscle (4). We report a successful intrathoracic serratus anterior transposition combined with a limited 5 ribs thoracopleuroplasty and the use of two intercostal flaps to obliterate a large apical TB (tuberculosis) cavity.

Correspondence to: Petre V-H Boțianu, 540139 Gheorghe Marinescu 66/1, Târgu-Mureș, România; e-mail: botianu_petre@yahoo.com
CASE REPORT

We present a 28 years old male, diagnosed with TB six years ago (positive sputum cultures). He was repeatedly admitted to the Târgu-Mureș Pneumophysics Clinic, with very poor compliance to the treatment, including hospital leaving and complete abandoning of TB static drugs. During the last 3 months he has presented with chest pain, hemoptisis, fever (38-39°C), progressive dyspnea, alteration of the biological status with important weight loss (7 kg in 2 months). The patient was readmitted to the Târgu-Mureș Pneumophysics Clinic where the CXR (Chest X-Ray) showed a giant cavern located in the upper part of the left hemithorax (fig.1). The CT scan confirmed the presence of a left apical cavern with a peripheric evolution leading to an almost complete pleuralisation; contralateral nodules and infiltrates were also present, as well as compensatory hyperinflation of the right lung with important deviation of the mediastinum towards the left (“natural thoracoplasty”). Bronchoscopy showed diffuse chronic bronchitis and a large fistula on the culmenal bronchus. Spirometry showed a severe mixed ventilatory disfunction (VC 28%, FEV1 31%) which contraindicated lobectomy.

Fig. 1 Preoperative CXR and CT scan: giant apical cavity; there are contralateral nodules and infiltrates, with compensatory hyperinflation of the right lung, deviation of the mediastinum and retraction of the left hemithorax.

Fig. 2 and 3 - intraoperative images: opening of the cavity and exploration of the bronchial fistula (left) and aspect of the two intercostal flaps – the anterior one falls tension-free over the bronchial fistula (right).
After an adequate preoperative preparation, surgery was performed under general anesthesia with selective intubation; unipulmonary ventilation was however poorly tolerated, requiring quasi-permanent ventilation of both lungs. Access was achieved through a postero-lateral incision with partial mobilisation of the chest wall muscles from the upper part of the chest. After identification of the cavity, a window was created through a limited resection of the 6th rib. This access allowed the entering in a completely pleuralised cavern extending from the 6th rib to the apex, presenting an 8 mm diameter fistula located in the antero-inferior part of the cavity. (fig. 2 and 3). After subperiostal topographic removal of a 10-15 cm length from the ribs 5 to 2, the pleuro-periostal plane was sectioned with creation of two intercostal flaps smaller one with anterior irrigation and the larger one with posterior blood supply. The serratus anterior was completely mobilised from the chest wall and scapula, keeping both the thoraco-dorsal branch and the lateral thoracic vessels intact (fig. 4 and 5). The bronchial fistula was closed and reinforced using the anterior intercostal flap, the sutures being performed using late-resorbable stitches. After installation of a closed-circuit irrigation-aspiration system, the posterior intercostal flap was placed to fill the cul-de-sac located under the first rib and the serratus anterior flap was brought over to fill the entire cavity. For a better obliteration of the cavity and an indirect fixation of the flaps, the tip of the scapula was inclavated below the 7th rib, in a position closed to the normal one (fig. 6 and 7). The skin and subcutis were closed with separate stitches in a single layer, followed by compressive bandage.

Postoperative course was difficult, requiring 36 hrs of mechanical ventilation and also inotropic support (dopamine) for 72 hrs. In the 12th postoperative day the patient developed an upper digestive bleeding through diffuse gastritis, which responded to conservative treatment (plasma, blood, proton-pump inhibitors and temporary cease of TBstatic treatment).

The cultures from the bronchial fistula and the pleural biopsy confirmed the active TB infection.

After overcoming of these complications from the immediate postoperative period, the evolution was eventually favourable, with per primam wound healing and complete obliteration of the cavity. He was discharged at 6 weeks after the operation with stable
cardio-respiratory status, afebrile, healed wound, negative sputum cultures and without clinical complaints; he was referred to the Pneumophtysiology Clinic to continue the TBstatic treatment.

At late follow-up the cavity is completely obliterated and the muscle flaps are viable. At 8 months after the operation, spirometry shows a mild improvement of the respiratory functional tests: VC 41% (+13%), FEV1 46% (+15%); the patient is in a good clinical condition, able to perform medium-intensity physical activity and with a good social reinsertion.

DISCUSSIONS

As a muscular flap, the serratus anterior is very useful for intrathoracic transposition (5, 6). It has a good vascularisation (thoraco-dorsal branch and the lateral thoracic vessels) and can be easily mobilised; it has an acceptable volume – about 10-15% of the post-pneumonectomy space and can easily reach any place in the upper part of the chest (7, 8, 9). Its mobilisation can be performed without important morbidity if some technical tips are respected (1, 10). It is preferred by some authors for closure of bronchial fistulae (11) or reinforcement of high-risk sutures (12, 13).

In our case, it was very useful for filling the cavity with a well-vascularised tissue; together with the use of the intercostal flaps, it has allowed the preservation of the first rib and avoidance of an extensive rib resection.

The case is also a typical example of the difficulties encountered in the modern management of TB infection (14, 15): incorrect treatment due to a reduced compliance in the absence of a sanatorial discipline led to the development of a giant apical cavity with large bronchial fistula manifested through dyspnea, fever and hemoptisis. Poor biological and respiratory status were absolute contraindications for a major lung resection and relative contraindications for thoracotomy. The combination of procedures used by us aimed to save the patient’s life through obliteration of the cavity with a minimal mutilation of the chest wall and a minimal interference with the respiratory function.

REFERENCES

REFERENCES (continued)

4. Mijatovic D, Bulic K, Dzepina I, Unusic J - The supply of blood in the skin territory above the lower part of the serratus anterior muscle, Coll Antropol 2006; 30(3):543-7


9. Erdogmus S, Govsa F - Distal variations of the neurovascular pedicle of the serratus anterior muscle as a flap, Surg Radiol Anat 2005; 27(2):100-


