Case report - Thoracic non-oncologic

Successfully treated descending necrotizing mediastinitis through thoracotomy using a pedicled muscular serratus anterior flap

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Abstract

Descending necrotizing mediastinitis (DNM) is rare and aggressive. A 68-year-old female with no medical history, was admitted to our institution for cervical cellulitis. After a conventional medical treatment, multiple abscesses of the upper mediastinum appeared on computed tomography (CT) findings. Although two cervicotomies were performed, a new necrotic abscess appeared in the anterior upper and middle mediastinum. An extensive debridement of cellulitis and abscess extended to the pericardium was made by thoracotomy. Middle mediastinum and pericardium were covered and reconstructed by a right pedicled serratus anterior flap. After radical surgery, follow-up was uneventful.

Early extensive and complete debridement of cervical and mediastinal collections and irrigation with broad-spectrum intravenous antibiotics is essential. Combined surgery is the best approach in DNM. The use of a pedicled muscular flap helps control the sepsis. In such cases, serratus anterior flap is a flap of choice because it is reliable and always available even in a skinny patient, contrary to omentum. In this life-threatening disease, an early aggressive combined surgery with debridement of all necrotic tissues extended to the pericardium if necessary associated with a pedicled flap is mandatory.

Keywords: Mediastinum; Thoracotomy; Flap

1. Introduction

Descending necrotizing mediastinitis (DNM) is rare and aggressive. Surgical treatment consists in cervicotomy in most of cases, associated or not with a thoracic approach. When the infection spreads until the middle mediastinum (type 2 in Endo’s classification of DNM [1]) thoracotomy must be use because of incomplete drainage or inadequate control of the mediastinal infection by transcervical drainage in 80% of cases [2]. A flap may be useful to control the sepsis. Recently, we successfully treated a patient with DNM, for whom mediastinal drainage by collar incision was insufficient.

2. Case report

A 68-year-old female with no medical history of smoking, alcohol, diabetes mellitus, or immunodeficiency, was admitted to our institution for cervical cellulitis secondary to angina treated initially with amoxicillin and non-steroid anti-inflammatory.

After 48 h without clinical improvement, a neck edema occurred. The patient was then referred in the Ear, Nose and Throat (ENT) Department.

Physical examination found a painful dysphagia associated with multiple lymphadenopathies.

The nasal fibroscopy revealed a bulging posterior pharyngeal wall. Computed tomography (CT)-scan showed a large retro-pharyngeal collection descending in the para-laryngeal area bilaterally with an upper mediastinal extension (Fig. 1a).

Biological findings showed a leukocytosis at 11,500/mm³ with 92% neutrophils and C-reactive protein was 240 mg/l.

Medical treatment was started: intravenous (IV) antibiotics: amoxicillin with clavulanic acid at double dose, corticosteroid dose gradually decreasing, and analgesic. Clinical monitoring and radiologic control was performed during follow-up.

Multiple abscesses of the upper mediastinum appeared on CT findings (Fig. 1b). Two cervicotomies were performed on day six and 13 for debridement of necrotic tissue and drainage. The mediastinum was drained by the neck.

Intraoperative bacteriological results found a Streptococcus anginosus sensitive to amoxicillin, but as the infection increased, a broad spectrum antibiotic therapy was begun associating vancomycin, piperacillin + tazobactam and amikacin to treat potential aero or anaerobic germs.

On day 20 appeared a new necrotic abscess in the anterior upper and middle mediastinum (Fig. 1c). The patient was referred to our department of thoracic surgery for surgical treatment of the descending necrotizing mediastinitis.

She was operated by right postero lateral thoracotomy with extensive debridement of cellulitis of the anterior and...
upper mediastinal abscess extended to the pericardium in the middle mediastinum. The excision included pericardium and the muscle flap covered the pericardium defect to avoid a spread of infection to the heart. The excision area and pericardium were covered and reconstructed by a right pedicled serratus anterior flap. It was put into mediastinum through the third intercostal space. A double pleural and a single mediastinal drainage were realized. Irrigation was used after cervical procedure. Mediastinum was drained at nine days (removed on day 29), anterior pleura was drained at seven days (removed on day 27) and posterior pleura was drained at 10 days (removed on day 30 after a CT-scan).

Chest tubes were removed after a normal controlled CT-scan (Fig. 1d): there were no more abscesses or empyema, no gas-forming infection, no unencapsulated fluid collection and no gas in the mediastinum.

The same antibiotic therapy was continued for six weeks (three IV and three per os) as bacteriological results remained sterile.

During hospitalization the patient was apyretic, with no other signs of sepsis. She was discharged on day 34 with decreasing inflammatory syndrome (6200 leukocytes/mm³ and CRP was 70 mg/l).

Three months after discharge, the patient presented a satisfactory clinical state, a CT-scan, done at this term, showed no signs of infection (as the CT-scan on day 30), reactionary pleural effusions disappeared, the flap muscle and its vascularization were visible.

### 3. Discussion

Criteria for the diagnosis of DNM were defined by Estrera et al.: (1) clinical manifestation of severe oropharyngeal infection; (2) radiologic features of mediastinitis on CT-scan; (3) documentation of necrotizing mediastinal infection at operation or postmortem, and (4) established relationship between oropharyngeal infection and development DNM [3]. Delay before diagnosis and surgery explains the high mortality rate of DNM [4]: between 16.5 and 40% [2–8]. In our case the patient was quickly referred to hospital and never showed any sign of sepsis. Nevertheless the follow-up proves that DNM can increase even though medical and surgical treatment has begun. DNM is a polymicrobial process [2, 3]. Early extensive and complete debridement of the cervical and mediastinal collections and irrigation with broad-spectrum intravenous antibiotics is essential [2, 4, 8]. The choice of the optimal operative procedure is determined by the infection’s extension which is evaluated by CT-scan [2].

Endo et al. classified patients into three groups: local DNM Type 1: localized to the upper mediastinal space or diffuse; Type 2A: extending to the lower and middle anterior mediastinum and Type 2B: extending to both anterior and posterior lower mediastinum [1, 4]. First our patient presents a type 1 of DNM then increased to Type 2A. Combined surgery is the best approach in DNM except in type 1 [3]. It is the only favorable factor for survival [5, 6]. Iterative operations may be necessary to control the infection [5–7]. In literature,
two cases of DNM treatment using a flap are reported [9, 10]. The patients underwent a median sternotomy using a pedicled omental flap. In our case, we use a pedicled muscular serratus anterior flap. We thought it was the flap of choice because it is reliable and always available even in a skinny patient (contrary to omentum) and because the sepsis remains controlled inside the pleural cavity.

4. Conclusion

In this life-threatening disease, an early aggressive combined surgery with debridement of all necrotic tissues associated with a pedicled flap is mandatory when anterior mediastinum is infected in CT-scan even if sepsis signs are not present.

References


