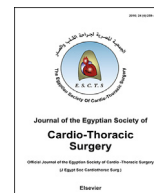


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## Early management of deep sternal wound infections using omental flaps



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### ABSTRACT

**Background:** Deep sternal wound infections (DSWI) are a grave complication that occurs in 0.3%–5% of post-sternotomy patients. In the meantime, there is no consensus over the most appropriate surgical management for sternal wound infections, following open heart surgery. In this retrospective study, we aimed to evaluate the early versus late use of omental-flaps for DSWI and mediastinitis.

**Methods:** This retrospective study included patients with DSWI following open cardiac surgeries with variable risk factors, degrees of infection and timing of management. The omental-flap was obtained from the greater omentum and transposed into the pleural cavity through a diaphragmatic incision.

**Results:** Out of the 15 enrolled patients, seven (46.6%) were diabetics and eight (53.3%) had chronic obstructive pulmonary disease. The severe form of mediastinitis occurred with gram-negative infections due to endotoxemia, as well as with resistant infections as methicillin-resistant staph aureus. Eleven patients had a primary omental-flap coverage after debridement (group I), while the other four underwent sternal rewiring, followed by omental-flap coverage (group II). Only three patients (27.2%) in group I died post-operatively, compared to four patients (100%) in group II. Among group I patients, eight had an early omental-flap coverage (IA), while three had a late coverage (IB). Only two patients died after early management, while five out of the seven (71.4%) patients (groups IB and II) died.

**Conclusions:** Early management of mediastinitis through omental-flaps has a better prognosis than rewiring. This should include a high index of clinical suspicion and a close post-operative follow-up of clinical manifestations.

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## 1. Introduction

Deep sternal wound infections (DSWIs) are a grave complication that occurs in 0.3%–5% of patients with chest wall defects after cardiac surgery [1,2]. According to the standardized Centre of Disease Control (CDC) surveillance criteria, DSWIs involve the layers beneath the skin and the subcutaneous tissue and may extend to the mediastinum [3]. In a study by Loop and colleagues, the authors reported a significant reduction in the incidence of deep chest wall defects and infections because of improved surgical techniques and the use of prophylactic antibiotics [4].

The risk factors for DSWIs include advanced age, preoperative comorbidities (such as diabetes mellitus, obesity and chronic obstructive pulmonary disease [COPD]), and operative practices (such as excessive diathermy use, prolonged cardiopulmonary bypass time and inadequate sterilization techniques) [5]. Commonly-isolated organisms from DSWIs include *Staphylococcus aureus* (29%), *Staphylococcus epidermidis* (22%), Streptococci, *Pseudomonas aeruginosa*, as well as facultative aerobic gram-positive and anaerobic bacilli [6–8].

The mortality rate, associated with untreated DSWIs is nearly 100%. With the current treatment regimens, it ranges between 14% and 47% [9]. The common causes of death include fatal hemorrhage, generalized sepsis and endocarditis [10]. Another serious complication of these wounds is extension to the mediastinum, causing “mediastinitis”. If left untreated, these infections may extend to the aortic and cardiac suture lines (causing hemorrhage), prosthetic grafts and intra-cardiac prostheses [11].

The development of vascularized flaps revolutionized the treatment of sternal infections. Beginning with the greater omental flap (GOF) in 1976, surgeons could transpose well-vascularized tissue into these relatively avascular wounds [12–14]. Other flaps include those of the pectoral muscle or reversed rectus abdominus. Although reconstruction with soft tissue flaps reduced the mortality rate of sternal infections, it increases the risk of surgical trauma and flap-related complications, such as herniation [15].

In the meantime, there is no consensus over the most appropriate surgical management of DSWIs, following open heart surgery. In this retrospective study, we aimed to evaluate the benefits of the early use of GOFs for DSWIs and mediastinitis.

## 2. Patients and Methods

### 2.1. Study design and patients

This is a retrospective study that was carried in the Cardiothoracic Department of Cairo University (ElKasr El-Ainy Hospital) over a period of three years from March 2010 to March 2013. The study included 15 post-open heart surgery cases (12 of them post-coronary artery bypass grafting [CABG] and three miscellaneous cases) with variable risk factors, degrees of infection and timing of management. In our study, all cases of mediastinitis were identified by purulent discharge from the sternotomy wound following superficial wound infection, fever and sternal instability (rocking). Computed tomography showed a retrosternal collection in all patients of mediastinitis. Only patients who signed a written informed consent were enrolled in this study.

### 2.2. Surgical procedures

Eleven included patients had GOF operation, while the remaining four cases were managed through debridement of the sternum and rewiring. The operation was considered early if performed within the first 14 days of the initial operation and was considered late if performed afterwards. However, following failure of the latter technique with persistence of infection, these patients were eventually treated by GOF insertion (Fig. 1). Therefore, all enrolled patients underwent GOF operation. We

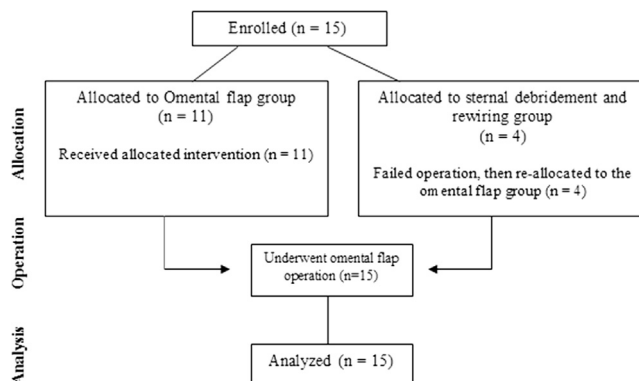


Fig. 1. Showing patient allocation and progress throughout our study.

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