



## EARLY REOPENING PERFORMED FOR THE MANAGEMENT OF COMPLICATIONS IN PATIENTS UNDERGOING CARDIO-THORACIC SURGICAL PROCEDURES

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### ABSTRACT

**Objective:** To detect the rate and predisposing factors for the development of postoperative complications requiring re-opening for their control in the immediate postoperative period.

**Methods:** During the time period 2014-2018, 453 patients who underwent a wide range of cardio thoracic surgery procedures, were retrospectively collected. Data of patients who underwent early re-operation for the management of postoperative complications were assessed for identification of the responsible causative factors.

**Results:** Overall, 20/453 patients (4.4%) underwent early re-operation to control postoperative complications. Early re-operation was obviated by the need to control bleeding or to drain clotted hemothoraces in 17 cases (85%), to manage a bronchopleural fistula in 1 case (5%), to manage wound dehiscence in 2 cases (10%).

The factors responsible for the development of mediastinal bleeding were multifactorial (Recent antiplatelet drug administration, usage of Heparin, Cardio pulmonary bypass, Diseased myocardium, technical) in 17 cases (85%), bronchopleural fistula were (Pneumonectomy, lung infections, mediastinal lymph node resection, technical) in 1 case (5%) and wound dehiscence (Prior lung infections, wound infection) in 2 cases (10%).

**Conclusions:** The rate of complications requiring reoperation after cardio thoracic surgery procedures is low and it is mainly related to the recent administration of antiplatelet drugs, heparin usage, Cardio pulmonary bypass, diseased myocardium, technical issues from the initial surgery, pneumonectomy and surgery for infectious diseases.

### KEYWORDS :

#### INTRODUCTION

Cardio thoracic surgery is associated with wide range of postoperative complications. The most common postoperative complications are atelectasis, supraventricular arrhythmias, prolonged air leak and bleeding. Postoperative retention pneumonia, empyema, bronchopleural fistula formation, chyle leak, wound problems, lobar torsion and nerve injuries are observed less frequently. In addition, other specific complications are related with specific procedures (i.e., pneumonectomy, resection of Pancoast tumors, esophagectomy). Most of the postoperative complications in cardio thoracic surgery are managed conservatively or with minor interventions, such as fiberoptic bronchoscopy, reinsertion of chest tube drain, chest needle drainage or the application of a vacuum assisted closure (VAC) device.

The need to proceed with reoperation in the immediate postoperative period in order to resolve a postoperative complication is not common and the observed rate after cardio thoracic surgery procedures or isolated lung parenchyma resection is reported to vary between 1.2% and 3.7%.

#### PATIENTS AND METHODS

During the time period 2014-2018 (five years), patients underwent a variety of cardio thoracic surgery procedures under general endotracheal anesthesia in an Academic/teaching Cardiothoracic department, Government Stanley medical college. Minor procedures, such as diagnostic/interventional fiberoptic or rigid bronchoscopy, thoracoscopy under local anesthesia, chest tube insertion, pericardiocentesis, insertion of a tracheal "T" tube, biopsies of scalene lymph nodes, open and dilational tracheostomy were excluded from the study.

All patients who underwent early reoperation for the management of surgical postoperative complications were retrospectively collected from the database of the department. Early reoperation was defined as any reoperation performed to control a postoperative complication within the four weeks immediate postoperative period or within the initial postoperative

hospitalization if this exceeding more than four weeks. Reoperations that were performed electively during the 4-week immediate postoperative period for oncologic reasons (completeness of resection) were excluded from the analysis. The notes of hospitalization and the notes of surgical procedures were assessed to retrieve all the required information for identifying the predisposing factors for reoperation.

Total procedure done	Cardiac procedures	Lung procedures
453	359	94

#### RESULTS

Overall, 20 out of the 453 patients (4.4%) underwent early reoperation for managing surgical postoperative complications during the 5-year study period. A list of all the postoperative complications observed during the study period is,

#### Complications requiring redo thoracic surgery for their management in the 453 patients of the study.

	No. of patients(%)
Mediastinal bleeding	17(3.7%)
Wound dehiscence	2 (0.4%)
Bronchopleural fistula	1(0.2%)
Total	20 (4.4%)

#### Reoperation for mediastinal bleeding

17 patients underwent reoperation to stop bleeding and/or to remove the accumulated blood clots from the chest. The initial access was a thoracotomy incision in all the 17 cases. Reopening of the thoracotomy incision took place between the day of surgery and the 3rd postoperative day. The effect of reoperation on overall postoperative hospital stay was moderate, since the median hospital stay from reoperation to discharge was eight days.

The majority of reoperations were performed on the 1<sup>st</sup> postoperative day. It is notable that majority of these patients were receiving antiplatelet drugs before surgery (clopidogrel or the combination of aspirin and clopidogrel) for cardiovascular diseases which were discontinued 5 to 7 days before surgery.

### Reoperation for wound dehiscence

2 patients underwent reoperation for wound dehiscence. The initial access was a thoracotomy incision under sterile aseptic precaution and pre op antibiotics. Reopening of the thoracotomy incision took place between the 7<sup>th</sup> day of surgery and the 10<sup>th</sup> postoperative day. The effect of reoperation on overall postoperative hospital stay was moderate, since the median hospital stay from reoperation to discharge was ten days. It is notable that majority of this patients had prior lung infections and postop wound infections.

### Reoperation for broncho pleural fistula

1 patient underwent reoperation for broncho pleural fistula. Pneumonectomy was implicated in bronchopleural fistula formation this patient. Reoperation was performed on the 10<sup>th</sup> postoperative day. Reoperation to control a bronchopleural fistula were associated with increase of the hospital stay (median time from reoperation to discharge: 18 days).

### Mortality of reoperations

Mortality of re-operations was nil. Early reoperation solved the problem allowing recovery of the patient.

### DISCUSSION

Historical series on reoperation for postoperative complications after thoracic surgery report the rate of bleeding or clotted hemothorax to be the leading cause for reoperation. This accounts for 52-75% of all reoperations. Bronchopleural fistulas accounted for 17.8-25.5% of all reoperations.

In the current study, the reoperation rate was higher (4.4%) than that reported in other series (1.2-3.7%). In contrary, mortality rate of reoperations was nil when compared with the mortality rate reported in other published series (13.3-37.7%).

The surgical management of complications requiring reoperation is debatable among thoracic surgeons and hence the aim of the current study is not to support or to propose any strategy or technique of management. The study focuses mainly on the rate of complications requiring reoperation and on the detection of possible predisposing factors for reoperation. The possible different opinions, strategies and surgical techniques used to resolve the complication or even the appropriate time to proceed with reoperation are out of the scope of the current study and they are not discussed.

The ongoing use of antiplatelets in medicine in order to prevent thrombosis in various cardiovascular pathologies seriously affects hemostasis in surgery, even if they are discontinued five days before surgery. Discontinuation of the antiplatelets carries high risk of thrombosis, especially in the clinical setting of drug eluting stents into coronary arteries and hence the most common policy is the discontinuation of antiplatelets and their replacement for a short-time before operation by a bridging agent, such as low molecular weight heparin. However, despite this policy platelet function is not completely normal during surgery and non-surgical bleeding from any raw surface in the operative field can occur. Areas of adhesiolysis, pleurectomy, mediastinal lymph node dissection, thoracotomy wound and site of chest tube insertion are the vulnerable sites for bleeding and accumulation of blood clots within the chest in cardio thoracic surgery. Other factors responsible for bleeding are Cardio pulmonary bypass, Diseased myocardium and technical. Pneumonectomy, lung infections, mediastinal lymph node resection and technical issues are responsible for broncho pleural fistula. Surgery for lung and pleural infections (clean-contaminated or contaminated operations) is the commonest cause for the development of thoracotomy wound suppuration and dehiscence.

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