Management of Deep Sternal Wound Infection

Essay submitted in partial fulfillment for Master Degree in General surgery

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LIST OF ABBREVIATIONS

^{99m}Tc-HMPAO	^{99m}Tc-hexamethylpropylene amine oxime
^{99m}Tc-UBI29–41	^{99m}Tc-labeled ubiquicidin 29–41
ASTA	Anti-Staphylolysin Test
ATA	Atmospheres Absolute
BG	Blood Glucose
BMI	Body Mass Index
CABG	Coronary Artery Bypass Grafting
CDC	Centers of Disease Control
CDI	Clostridium difficile Infection
CHG	Chlorhexidine Gluconate
CoNS	Staphylococcus epidermidis
CT	Computed Tomography
DSWI	Deep Sternal Wound Infection
ESAAS	Electrolyzed Strong Acid Aqueous Solution
GEA	Gastroepiploic Artery
HBO	Hyperbaric Oxygen
ICU	Intensive Care Unit
IgG	Immunoglovulin G
IMA	Internal Mammary Artery
ITA	Internal Thoracic Artery
MRSA	Methicillin-Resistant S. Aureus
MSCRAMMs	Microbial Surface Components Recognizing Adhesive Matrix Molecules

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NNIS	National Noscomial Infections Surveillance System
NPWT	Negative-Pressure Wound Therapy
OA	Omental Artery
PM	Postoperative Medistinitis
POD	Postoperative Day
RAT	Rectus Abdominis Transposition
SC	Sterno-Costal
SP	Sterno-Perforating
SPECT	Single-Photon Emission Computed Tomography
SSI	Surgical Site Infection
SWI	Sternal Wound Infection
TNP	Topical Negative Pressure
VAC	vacuum-Assisted Closure
WBCs	White blood cells

Introduction and Aim

INTRODUCTION

Postoperative mediastinitis (PM) or deep sternal wound infection (DSWI) is a serious and potentially lethal condition with an overall incidence varying from 0.4–5% ***(Segers et al., 2005)*** with associated mortality rate varies from 14% to 47% ***(El Oakley and Wright, 1996; Poncelet et al., 2008)***.

Gram-positive bacteria are the most commonly isolated organisms in mediastinitis; Staphylococcus aureus or S epidermidis are identified in 70% to 80% of cases ***(Demmy et al., 1990)***. Mixed infections may account for up to 40% of cases ***(Starr et al., 1984)***.

Commonly quoted risk factors include obesity, chronic obstructive pulmonary disease, elderly age, peripheral vascular disease, reoperation, use of internal thoracic artery (ITA) conduits, operation time, low cardiac output, ventilation time, and re-exploration for bleeding ***(Borger et al., 1998)***.

Prevention of wound complications is one of the most important aspects of management of patients undergoing cardiac surgery. Early diagnosis and treatment of mediastinitis may prevent the spread of infection to the prosthetic materials used in cardiac repair, with its devastating sequelae ***(El Oakley and Wright, 1996)***.

Conventional forms of treatment usually involve surgical revision with open dressings or closed irrigation, or reconstruction with vascularized soft-tissue flaps such as omentum or pectoral muscle. These conventional methods have reduced the mortality rate of mediastinitis, but without overwhelmingly satisfactory results ***(De Feo et al., 2011)***.

In recent years a new technique, the effectiveness of topical negative pressure (TNP) in the treatment of sternal wound infections after cardiac surgery has been introduced resulting in beneficial effects on blood flow to the wound and the proliferation of granulation tissue ***(Sjogren et al., 2005; Argenta et al., 2006)***. However, bleeding has been

reported as the major complication during negative pressure wound therapy for postoperative mediastinitis ***(Petzina et al., 2010)***.

Therefore, in the current study we review the literature for the topic of "postoperative mediastinitis" regarding its definition, classification, incidence, etiology, pathogenesis, risk factors, diagnosis, preventive measures, and modes of treatment.

Review of Literature