Perioperative Management of Antiplatelet Therapy in Patients with Coronary Artery Stenting Undergoing Urgent Surgery

Essay

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By

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Mohammed Nabil Afifi

Contents

List of Abbreviations

ACC	:	American college of cardiology
AHA	:	American heart association
APTT	:	Activated partial thromboplastin time
ASRA	:	American society of regional anesthesia
BMS	:	Bare metal stents
CABG	:	Coronary Artery Bypass Grafting
CAD	:	Coronary artery disease
DES	:	Drug-Eluting Stents
ECG	:	Electrocardiographic
GDMT	:	Guideline Directed Medical Therapy
GWC	:	Guideline writing committee
LAD	:	Left anterior descending (interventricular)
LMWH	:	Low Molecular Weight Heprin
MACE	:	Major Adverse Cardiac Event
MI	:	Myocardial infarction
mTOR	:	Mammalian target of rapamycin
PT	:	Prothrombin time
PWA	:	Platelet works analyzer
RCA	:	Right coronary artery.

List of Abbreviations (Cont.)

TTP	:	Thrombotic thrombocytopenic purpura
TxA2	:	Thromboxane A2
VEGF	:	Vascular endothelial growth factor

List of tables

List of Figures

Introduction

The coronary stent is a relatively new tool used to keep stenotic coronary arteries open, the number of patients with coronary artery stents presenting for surgery is on the rise ***(Hawn et al., 2013).***

After stent implantation, it is recommended that patients receive 6 weeks to 12 months of dual antiplatelet therapy, 3,4 typically consisting of acetylsalicylic acid combined with clopidogrel, although dual antiplatelet therapy often is continued beyond this time frame. Within 1 year of stent implantation, 4% to 5% (36,000-45,000 patients) of such patients will require surgery, a number that rises to 11% (99,000 patients) within 2 years of stenting ***(Bell et al., 2011).***

Clinicians may rely on practice guidelines to assist with decisions regarding perioperative antiplatelet management in patients with coronary stents who need urgent surgery. While such guidelines are available, they appear to vary according to methodological approaches and recommendations ***(Drs Darvish-Kazem et al., 2013).***

The peri-operative period for a patient having a coronary artery stent undergoing urgent surgery is especially problematic as surgery induces a hyper-coagulable state, while surgeons often prefer to stop anti-

platelet drugs pre-operatively to minimize the risk of surgical bleeding in some procedures, thus putting the patient at high risk of stent thrombosis ***(Mehta et al., 2005).***

On the other hand, the prevention of stent thrombosis is of paramount importance. Initially, it was tackled by the use of complex anticoagulation regimes using aspirin, heparin and warfarin, but in turn this led to high rates of major bleeding, vascular complications and long hospital stays. The development of new anti-platelet agents led to a breakthrough in the use of coronary stents with the adoption of dual anti-platelet regimes ***(Mehta et al., 2013)***.

The earlier the surgery is performed after stenting, the higher the risk for stent thrombosis. According to the American College of Cardiology /American Heart Association guidelines. Intra-operatively monitoring must be achieved well. The anesthesiologist should also select the drugs with the objective of minimizing demand and optimum supply of oxygen ***(Darvish-Kazem et al., 2013)***.

Close postoperative observation and management should be performed. Postoperative pain, respiratory distress, hypovolemia, and anemia are common clinical conditions that may result in excess cardiovascular stress and can result in ischemia or a myocardial infarction. Postoperative antiplatelet is mandatory as soon as possible.

To conclude, the patient with coronary artery stent that undergoes urgent requires not only optimal timing of surgery, but also needs accurate perioperative risk assessment, anti-platelet therapy management, and sufficient optimization to enhance the oxygen delivery to the tissues, as well as a strict postoperative management ***(Sharma et al., 2004).***

Aim of the work

To discuss the perioperative management of antiplatelet therapy in patients with coronary artery stenting undergoing urgent surgery to minimize the risk of sent thrombosis, that is becoming an increasingly frequent challenge for anaesthetists.

Chapter 1

Arterial Supply of the Heart

Arterial Supply of the Heart:

The arterial supply of the heart is provided by the right and left coronary arteries, which arise from the ascending aorta immediately above the aortic valve (Fig. 1). The coronary arteries and their major branches are distributed over the surface of the heart, lying within subepicardial connective tissue ***(McCarthy et al., 2001).***

The Right Coronary Artery arises from the anterior aortic sinus of the ascending aorta and runs forward between the pulmonary trunk and the right auricle. It descends almost vertically in the right atrioventricular groove, and at the inferior border of the heart it continues posteriorly along the atrioventricular groove to anastomose with the left coronary artery in the posterior interventricular groove. The following branches from the right coronary artery supply the right atrium and right ventricle and parts of the left atrium and left ventricle and the atrioventricular septum. ***(Carvalho et al., 1998)***

Branches of the right coronary artery:

- The Right Conus Artery supplies the anterior surface of the pulmonary conus (infundibulum of the right

ventricle) and the upper part of the anterior wall of the right ventricle.

- The Anterior Ventricular branches are two or three in number and supply the anterior surface of the right ventricle. The marginal branch is the largest and runs along the lower margin of the costal surface to reach the apex.The Posterior Ventricular branches are usually two in number and supply the diaphragmatic surface of the right ventricle. ***(McCarthy et al., 2001)***

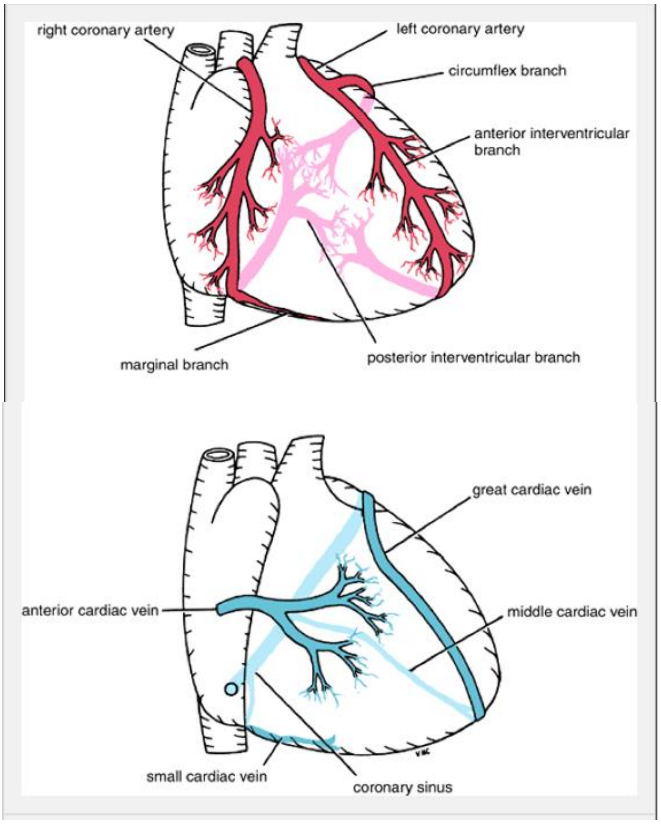

Fig. (1): Coronary arteries and veins. ***(McCarthy et al., 2001)***

The Posterior Interventricular (descending) artery runs toward the apex in the posterior interventricular groove. It gives off branches to the right and left ventricles, including its inferior wall. It supplies branches to the posterior part of the ventricular septum but not to the apical part, which receives its supply from the anterior interventricular branch of the left coronary artery. A large septal branch supplies the atrioventricular node. In 10% of individuals the posterior interventricular artery is replaced by a branch from the left coronary artery. ***(Josen et al., 2001)***.

The atrial branches supply the anterior and lateral surfaces of the right atrium. One branch supplies the posterior surface of both the right and left atria. The artery of the sinuatrial node supplies the node and the right and left atria; in 35% of individuals it arises from the left coronary artery ***(Josen et al., 2001)***.

The Left Coronary Artery, which is usually larger than the right coronary artery, supplies the major part of the heart, including the greater part of the left atrium, left ventricle, and ventricular septum. It arises from the left posterior aortic sinus of the ascending aorta and passes forward between the pulmonary trunk and the left auricle. It