

A case report of acute mesenteric ischemia post coronary artery bypass graft with concomitant aortic valve replacement

Karthigesu Aimanan, Yee Ling Tan, Saravana Kumar Karupiah, Muhammad Nor, Mohamad Arif, Chew Loon Guan, Balaji Padmanaban

ABSTRACT

Introduction: The incidence of post-cardiac surgery gastrointestinal emergencies ranges between 0.4–2.9% and are often of varying diagnoses. Although acute mesenteric ischemia is infrequent, it represents 10–67% of these complications and carries an overall mortality rate of almost 95% of non-surgically treated patients compared to approximately 57% of surgically treated patients. The high number of mortalities is mainly due to its protean clinical presentations resulting in a delay in diagnosis.

Case Report: We report a case of acute mesenteric ischemia in a patient who had undergone coronary artery bypass graft (CABG) with concomitant aortic valve surgery. Progressive abdominal distention and rising lactate level were the features pointed towards diagnosis of mesenteric ischemia in this patient. Based on a literature search and review, we discuss on the pearls and pitfalls in the management of this case; with aim to improve the outcome of such similar case in future.

Conclusion: Gastrointestinal complications post cardiac surgery should be treated aggressively. Routine utilization of risk assessment tools such as GICS scoring model; timely intervention such as lower the threshold for diagnostic laparoscopy and selective mesenteric angiography may improve the outcome of this group of patients.



International Journal of Case Reports and Images (IJCRI)



International Journal of Case Reports and Images (IJCRI) is an international, peer reviewed, monthly, open access, online journal, publishing high-quality, articles in all areas of basic medical sciences and clinical specialties.

Aim of IJCRI is to encourage the publication of new information by providing a platform for reporting of unique, unusual and rare cases which enhance understanding of disease process, its diagnosis, management and clinico-pathologic correlations.

IJCRI publishes Review Articles, Case Series, Case Reports, Case in Images, Clinical Images and Letters to Editor.

Website: www.ijcasereportsandimages.com

CASE REPORT

PEER REVIEWED | OPEN ACCESS

A case report of acute mesenteric ischemia post coronary artery bypass graft with concomitant aortic valve replacement

Karthigesu Aimanan, Yee Ling Tan, Saravana Kumar Karupiah, Muhammad Nor, Mohamad Arif, Chew Loon Guan, Balaji Padmanaban

ABSTRACT

Introduction: The incidence of post-cardiac surgery gastrointestinal emergencies ranges between 0.4–2.9% and are often of varying diagnoses. Although acute mesenteric ischemia is infrequent, it represents 10–67% of these complications and carries an overall mortality rate of almost 95% of non-surgically treated patients compared to approximately 57% of surgically treated patients. The high number of mortalities is mainly due to its protean clinical presentations resulting in a delay in diagnosis. **Case Report:** We report a case of acute mesenteric ischemia in a patient who had undergone coronary artery bypass graft (CABG) with concomitant aortic valve surgery. Progressive abdominal distention and rising lactate level were the features pointed towards diagnosis of mesenteric ischemia in this patient. Based

on a literature search and review, we discuss on the pearls and pitfalls in the management of this case; with aim to improve the outcome of such similar case in future. **Conclusion:** Gastrointestinal complications post cardiac surgery should be treated aggressively. Routine utilization of risk assessment tools such as GICS scoring model; timely intervention such as lower the threshold for diagnostic laparoscopy and selective mesenteric angiography may improve the outcome of this group of patients.

Keywords: Acute mesenteric ischemia, Mesenteric angiography, Diagnostic laparoscopy

How to cite this article

Aimanan K, Tan YL, Karupiah SK, Nor M, Arif M, Guan CL, Padmanaban B. A case report of acute mesenteric ischemia post coronary artery bypass graft with concomitant aortic valve replacement. Int J Case Rep Images 2016;7(6):392–396.

Article ID: Z01201606CR10659KA

doi:10.5348/ijcri-201671-CR-10659

Karthigesu Aimanan¹, Yee Ling Tan², Saravana Kumar Karupiah³, Muhammad Nor³, Mohamad Arif³, Chew Loon Guan², Balaji Padmanaban³

Affiliations: ¹Department of General Surgery, National University of Malaysia, Malaysia; ²Department of Vascular and General Surgery, Serdang Hospital, Selangor, Malaysia; ³Department of Cardiothoracic Surgery, Serdang Hospital, Selangor, Malaysia.

Corresponding Author: Dr. Karthigesu Aimanan, Post graduate trainee, Department of General Surgery, National University of Malaysia, Yaacob Latif Road, Tun Razak City, 56000 Cheras, Kuala Lumpur, Malaysia; Email: karthi_abim@yahoo.com

Received: 30 January 2016

Accepted: 02 March 2016

Published: 01 June 2016

INTRODUCTION

Mesenteric ischemia post-cardiac surgery is a rare event with incidence rate ranging from 0.2–0.4%. Despite the rare occurrence it carries an overall mortality rate of almost 95% of non-surgically treated patients, compared to approximately 57% of surgically treated patients [1].

The causes of acute mesenteric ischemia can be divided into: acute embolism to the superior mesenteric artery, acute thrombosis of an atherosclerotic plaque, splanchnic vasoconstriction leading to regional ischemia that is called non-occlusive mesenteric ischemia (NOMI), and mesenteric venous thrombosis. Most often intestinal ischemia after cardiac surgery is due to an NOMI. Arterial emboli as in this patient is less commonly seen, however, the principle of management of bowel ischemia remains same despite the aetiology.

Diagnosing this condition in the intensive care setting is difficult due to its subtle presentation. Surgeons and trainees should be well accustomed to the heterogeneous presentation and appropriate diagnostic modalities to aim for an early intervention.

CASE REPORT

A 68-year-old male with two vessel disease involving left main stem coronary artery and severe aortic regurgitation was electively admitted for CABG. He has underlying hypertension, dyslipidemia and diabetes mellitus on treatment. Upon admission, he complained of chest pain on moderate activity (CCS 2) and paroxysmal nocturnal dyspnea. Otherwise denied orthopnea and leg swelling. Cardiovascular examination revealed a grade 3 mid-diastolic murmur at left second intercostal space radiating to the axilla. Respiratory and abdominal examinations were unremarkable. His coronary angiogram was dated three months ago showed distal left main stem coronary artery stenosis (LMS) of 50–70%, proximal and distal left anterior descending coronary artery stenosis of 30–40%, proximal left circumflex stenosis of 50% and normal right coronary artery. An echocardiogram performed three months ago revealed good left ventricular function, moderate aortic regurgitation with aortic valve annulus 1.8 cm². Preoperative blood investigations were unremarkable.

Initially, this patient was planned for coronary artery bypass graft. Perioperative discussion with cardiologist suggested for concomitant aortic valve replacement given moderate aortic regurgitation in left main stem coronary artery disease. Surgery was performed in the usual manner, distal anastomosis of conduits followed by valve replacement and later proximal anastomosis. Pedicled left internal mammary artery grafted to diagonal branch, saphenous vein graft anastomosed to left anterior descending artery and obtuse marginal with good distal runoff. The aortic annulus was calcified with a thickened valve size of 19 mm perimount tissue. Bioprosthesis valve was replaced via aortotomy. Intraoperative transoesophageal echocardiogram revealed well-functioning valve with no perivalvular leakage. The patient was transferred to ICU with stable hemodynamics. On day-1 postoperative, the patient was extubated and started on routine post-operative medications such as metoprolol, aspirin, and

subcutaneous fondaparinux. On day-3 postoperative, he became more tachypneic, and the chest X-ray showed atelectasis of left lower zone. A 12-lead ECG showed atrial fibrillation and he was started on amiodarone. Shortly after that he was intubated given impending respiratory collapse due to hypoxemia, rising CO₂, and lactate level. Transoesophageal echocardiogram post intubation showed good left ventricular contractility and excluded cardiac tamponade. The patient was referred to general surgery on the same day due to worsening abdominal distention and coffee ground bleeding from Ryle's tube. Urgent esophagoduodenoscopy performed by general surgical team noted Forrest 3 ulcer at antrum otherwise no active bleeding. An abdominal X-ray revealed dilated small bowel 4 cm in size, with no thickening of the bowel wall (Figure 1). Progressive abdominal distention, rising lactate level, and negative esophagoduodenoscopy prompted us towards further imaging to rule out mesenteric ischemia. Mesenteric angiography was done after few hours showed occluded superior mesenteric artery. Emergency exploratory laparotomy revealed ischemic bowel extending from segment two of duodenum until rectum (Figure 2). Abdomen was closed, and patients' poor prognosis was explained to family members. The patient became more unstable later on the same day (day-3 postoperative) and passed away despite on inotropic support.

DISCUSSION

The causes of acute mesenteric ischemia can be divided into: acute embolism to the superior mesenteric artery, acute thrombosis of an atherosclerotic plaque,

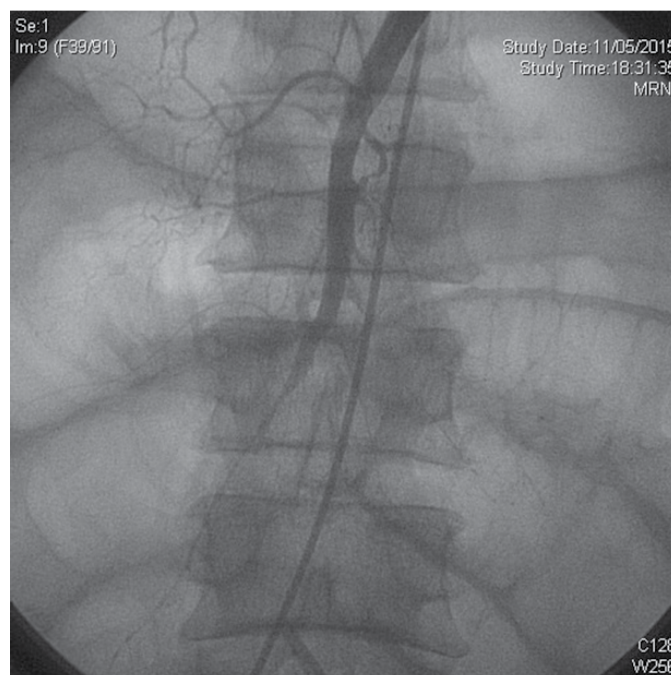


Figure 1: Mesenteric angiogram showing obstruction of superior mesenteric artery.



Figure 2: Intraoperative finding of ischemic bowel.

splanchnic vasoconstriction leading to regional ischemia that is called non-occlusive mesenteric ischemia (NOMI), and mesenteric venous thrombosis. Most often intestinal ischemia after cardiac surgery is due to an NOMI. Arterial emboli as in this case is less commonly seen, however, the principle of management of bowel ischemia remains same despite the aetiology.

The clinical challenges of managing acute mesenteric ischemia are mainly attributable to its misleading presentation, the inconclusive laboratory values, and radiological investigations, thus contributing to a delay in intervention. Clinical assessment should be focused on salient points such as the inability to tolerate nasogastric tube feeding, gastrointestinal bleed, worsening metabolic acidosis despite adequate resuscitation and rising trend of septic parameters. However in mechanically ventilated and sedated patients as in our patient evaluation of these signs might be difficult. This dilemma can be overcome by a regular use of postoperative gastrointestinal complication risk predictive tools such as GICS scoring models in patients with high index of suspicion [2]. This model includes the age factor, smoking habit, preoperative inotropic support, NYHA class, cardiopulmonary bypass time, and the postoperative factors such as atrial fibrillation, heart failure, vascular complication, and reoperation due to bleeding in the scoring. Albeit the validity and end results of this scoring system is debatable, it is a good adjunct as an assessment tool, to guide clinicians towards further management of suspected cases of acute mesentery ischemia post coronary surgery.

Angiography remain a better imaging option for visualization of the vessels and a therapeutic intervention.

However, angiography is an invasive, time consuming and potentially nephrotoxic procedure. Its routine use is controversial in emergency situations, and therefore, it is employed only in selected patients. Klotz et al. has suggested few indications for selective mesenteric angiography as a :

- (i) absence of defecation for more than three days after surgery, despite maximal supportive treatment,
- (ii) severe abdominal distension,
- (iii) clinical and radiologic signs of paralytic ileus, or
- (iv) raised serum lactate.

These features should guide the primary team to arrange for an early selective angiography, thus facilitate a timely intervention. When used in the absence of peritonitis signs, angiography has been shown to improve the survival rate [3]. Computed tomography scan is another alternative but it is of limited use in the diagnosis of AMI. A normal CT finding in a patient with high suspicion of mesenteric ischemia should prompt an angiography without delay [4].

Early intervention of mesenteric ischemia in the initial 6–8 hours resulted in a good postoperative outcome. The low rate of morbidity, as well as the easy availability and repeatability of laparoscopy in principle, favor the use in urgent diagnosis for mesenteric ischemia over time-consuming imaging modalities. Diagnostic laparoscopy reports a high sensitivity (94%) for the correct diagnosis of intra-abdominal complications after major cardiac surgery [5]. Another mode of investigation been described in literature is diagnostic peritoneal lavage. Lee and colleague in their retrospective study have concluded diagnostic peritoneal lavage is associated with reduced operative intervention yet improved survival, when compared with patients evaluated with either CT or no diagnostic modality. These data support that, for critically ill intensive care patients suspected of harbouring intra-abdominal pathology such as acute mesenteric ischemia, diagnostic peritoneal lavage should be a mainstay in the preoperative diagnostic evaluation.

The conventional intraoperative method of determining bowel ischemia is by visual evaluation of the bowel based on arterial pulsations, intestinal peristalsis, and color, although these findings are not specific. Laparotomy without a preoperative imaging always has a risk of underestimating the extent of ischemia by failing to remove the bowel segments with affected mesenteric vessels. An alternative reliable technique to determine the hypoxic damage of bowel wall is by detecting intravenously injected sodium fluorescein using a wood lamp [6].

In patients with arterial occlusive AMI, when significant length of bowel is potentially viable, establishing blood flow before resection of the infarcted bowel may improve the survival. Although surgical revascularization is the standard procedure, embolectomy, thrombectomy, endarterectomy, as well as endovascular stenting provide appealing alternatives

with a good short-term outcome. Contraindications to revascularization include apparent infarction of the bowel supplied by the affected artery, patient's instability hinder further resection, and mesenteric vein thrombosis.

CONCLUSION

Post-cardiac surgery gastrointestinal complications should be treated aggressively to ensure a good outcome. The outcome of mesenteric ischemia post operatively can be improved with the utilization of GICS scoring model, lower the threshold for diagnostic laparoscopy or laparotomy and timely mannered selective mesenteric angiography.

Author Contributions

Karthigesu Aimanan – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Yee Ling Tan – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Saravana Kumar Karupiah – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Muhammad Nor – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Mohamad Arif – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Chew Loon Guan – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Balaji Padmanaban – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

Copyright

© 2016 Karthigesu Aimanan et al. This article is distributed under the terms of Creative Commons Attribution License which permits unrestricted use, distribution and reproduction in any medium provided the original author(s) and original publisher are properly credited. Please see the copyright policy on the journal website for more information.

REFERENCES

1. Andersson B, Nilsson J, Brandt J, Höglund P, Andersson R. Gastrointestinal complications after cardiac surgery. *Br J Surg.* 2005 Mar; 92(3):326-33. PMID: 15672438.
2. Andersson B, Andersson R, Brandt J, Höglund P, Algotsson L, Nilsson J. Gastrointestinal complications after cardiac surgery - improved risk stratification using a new scoring model. *Interact Cardiovasc Thorac Surg.* 2010 Mar; 10(3):366179 - 70. PMID: 19995792
3. Grace PA, Da Costa M, Qureshi A, Sheehan S, Burke P, Bouchier-Hayes D. An aggressive approach to acute superior mesenteric arterial ischemia. *Eur J Vasc Surg.* 1993 Nov; 7(6):731-2. PMID: 8270080
4. Brandt LJ, Boley SJ AGA technical review on intestinal ischemia. American Gastrointestinal Association. *Gastroenterology.* 2000 May; 118(5):954-68. PMID: 10784596
5. Hackert T, Kienle P, Weitz J, Werner J, Szabo G, Hagl S, Büchler MW, Schmidt J. Accuracy of diagnostic laparoscopy for early diagnosis of abdominal complications after cardiac surgery. *Surg Endosc.* 2003 Oct; 17(10):1671-4. PMID: 12915977
6. Bulkley GB, Zuidema GD, Hamilton SR, O'Mara CS, Klacsmann PG, Horn SD. Intraoperative determination of small intestinal viability following ischemic injury: a prospective, controlled trial of two adjuvant methods (Doppler and fluorescein) compared with standard clinical judgment. *Ann Surg.* 1981 May; 193(5):628-37. PMID: 7016053.

Access full text article on
other devices



Access PDF of article on
other devices



Edorium Journals: An introduction

Edorium Journals Team

About Edorium Journals

Edorium Journals is a publisher of high-quality, open access, international scholarly journals covering subjects in basic sciences and clinical specialties and subspecialties.

Invitation for article submission

We sincerely invite you to submit your valuable research for publication to Edorium Journals.

But why should you publish with Edorium Journals?

In less than 10 words - we give you what no one does.

Vision of being the best

We have the vision of making our journals the best and the most authoritative journals in their respective specialties. We are working towards this goal every day of every week of every month of every year.

Exceptional services

We care for you, your work and your time. Our efficient, personalized and courteous services are a testimony to this.

Editorial Review

All manuscripts submitted to Edorium Journals undergo pre-processing review, first editorial review, peer review, second editorial review and finally third editorial review.

Peer Review

All manuscripts submitted to Edorium Journals undergo anonymous, double-blind, external peer review.

Early View version

Early View version of your manuscript will be published in the journal within 72 hours of final acceptance.

Manuscript status

From submission to publication of your article you will get regular updates (minimum six times) about status of your manuscripts directly in your email.

Our Commitment

Six weeks

You will get first decision on your manuscript within six weeks (42 days) of submission. If we fail to honor this by even one day, we will publish your manuscript free of charge.*

Four weeks

After we receive page proofs, your manuscript will be published in the journal within four weeks (31 days). If we fail to honor this by even one day, we will publish your manuscript free of charge and refund you the full article publication charges you paid for your manuscript.*

Favored Author program

One email is all it takes to become our favored author. You will not only get fee waivers but also get information and insights about scholarly publishing.

Institutional Membership program

Join our Institutional Memberships program and help scholars from your institute make their research accessible to all and save thousands of dollars in fees make their research accessible to all.

Our presence

We have some of the best designed publication formats. Our websites are very user friendly and enable you to do your work very easily with no hassle.

Something more...

We request you to have a look at our website to know more about us and our services.

* Terms and condition apply. Please see Edorium Journals website for more information.

We welcome you to interact with us, share with us, join us and of course publish with us.



Edorium Journals: On Web



Browse Journals

CONNECT WITH US

