Gastrointestinal Complications Following Heart Surgery: An Updated Review

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ABSTRACT

Background and Aims: To focus through a related literature research and the authors’ personal experience on the issue of gastrointestinal complications after heart surgery.

Methods: We included in our review article selected studies dealing with the issue of gastrointestinal complications after heart surgery.

Results: All related studies concluded to a relative small incidence for gastrointestinal complications after heart surgery of about 0.5 to 1.0%. However, the overall mortality was estimated to be disproportionally high, making the impact of these postoperative pathologies a significant one.

Conclusions: Gastrointestinal complications consist a quite rare and often difficult to diagnose category of complications after heart surgery, which despite their small incidence, influence the overall mortality rate of cardiac operations. Time-sparing, meticulous performance of the operations and early diagnosis are the best measures against these complications.

INTRODUCTION

Gastrointestinal (GI) complications occurring after cardiac surgery are considered as “second line” complications due to their scarcity. Cardiac surgeons, ICU staff and nursing personnel are usually aware and suspicious of cardiac-related mishappenings after heart surgery; however they often tend to underestimate potentially lethal manifestations involving the gastrointestinal tract, or organs of the abdomen and subsequent complications because of their relative infrequency and the fact that they lack a “visible connection” to the primary target organ of the operation.

These complications range from a simple, temporary paralytic ileus, to more grave, highly perilous conditions, such as gastrointestinal hemorrhage, acalculous cholecystitis, acute pancreatitis, liver failure or mesenteric ischemia (Table 1). A total mortality rate of 12-14.5% speaks for itself regarding the gravity of these nosological entities²⁻¹³.

Herein, we are performing a thorough review of the up to date literature, focusing on epidemiology, etiology, impact on the postoperative course of cardiac patients as well as modalities of prevention and treatment.
Another study that comprised a large number of participants was of Venkateswaran, which identified the incidence of acute mesenteric ischemia following cardiopulmonary bypass in 11,202 patients [16]. The aforementioned study concluded an incidence of 0.49% for acute mesenteric ischemia in all patients undergoing cardiopulmonary bypass (CPB). Predictors of death from GI complications in general, which also covered intestinal ischemia, included New York Heart Association (NYHA) class III and IV heart failure, smoking, chronic obstructive pulmonary disease, history of syncope, aspartate aminotransferase (AST) >600 U/L, direct bilirubin >2.4 mg/dL, pH < 7.30, and the need for more than two inotropic agents with vasopressive action.

Emmiller et al. [17] added another potential predictor: the application of extracorporeal circulation. In their retrospective study of 2,625 patients, they compared patients operated with the heart-lung machine with patients who were operated on beating heart. The intestinal ischemia incidence was 0.4% for the first group versus 0.2% for the latter. Similarly, mortality rate for the first group reached 0.2%, while the beating heart group presented no deaths. Additionally, Schuetz et al. [18] exhibited similar incidence rates and 83% mortality for patients affected by intestinal ischemia. Both the above mentioned studies suggested that arteriosclerotic CABG, age >70 years and dehydration as predisposing factors for the development of intestinal ischemia, and recommended prompt performance of angiography and laparotomy as critical interventions that could lower the high mortality rate.

Abboud et al. [19] has also mentioned the devastating effects of CPB that produces ischemia/reperfusion syndrome of the intestine. The endpoints of this review were that CPB is incriminated for systemic abnormalities, leading to multi-organ failure and death. On the other hand, Musleh et al, concluded that application of CPB does not seem to provoke higher percentages of GI complications [20].

**Gastrointestinal bleeding**

Upper gastrointestinal bleeding, particularly in patients with a previous history of gastric or duodenal ulcer, is another significant gastrointestinal complication after heart surgery. Contributing factors include preoperative fasting, perioperative coagulation disorders and the systemic inflammatory response which is connected with the application of extracorporeal circulation and, of course, history of gastric or duodenal ulcer. Jayaprakash et al. [21] retrospectively studied 2,274 patients concluding to an incidence for gastrointestinal bleeding of 0.9% and a total mortality rate of 15%, while none of the operated patients deceased. Mean interval between surgery and bleeding approximated 10 days. Houssa et al. [22] investigated a series of 1,278 patients and found an incidence for upper gastrointestinal bleeding of 0.6%, a surgical exploration rate of 25% and a mortality rate of 12.5%.

**Acute cholecystitis**

Acute cholecystitis includes both calculous as well as acalculous cholecystitis, which occurs more frequently and affects more morbidity patients. It is attributed both to the systemic hypoperfusion and the systemic inflammatory response which is associated with extracorporeal circulation and is characterised, among others, by coagulation disorders, fluid removal towards the interstitial space, leukocyte count elevation and complement factors activation.

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**Liver failure**

Liver dysfunction in a broad sense, which include patient cases with significant liver enzymes’ elevation can affect up to 25% of heart-operated patients. Apart from SGOT, SGPT and γ-GT elevation, severe consequences of liver failure consist of hypoalbuminemia, malabsorption of hepatically metabolised drugs and malfunction of coagulation factors. Main causes include side effects of anesthetic drugs and inotropic agents, while mechanical pressure from a low-placed vena cava inferior cannula has also been reported. Proper conservative treatment entails control of fluids and electrolytes and replenishment of nutritive and coagulation factors. Finally, postoperative hepato cellular injury was found to increase with CPB as Ascione et al, estimated in their trials [26].
Ileus

In its simple form it affects almost every patient submitted to heart surgery. Paralytic ileus accepted as one of the most frequent complications in a series of 3,312 patients according to Simic et al. [27]. Perioperative fasting, the effect of anaesthetic drugs and patients’ immobilisation during the first postoperative days, contribute to a temporary intestinal paralysis, which in the vast majority of cases regresses automatically after the initiation of alimentation. In a small proportion of patients the intestinal paralysis persists after the fourth postoperative day; in these cases the application of suppositories or enemas may be necessary; these measures in conjunction with precise monitoring and regulation of all electrolytic disorders are usually sufficient for the recovery of intestinal function.

CONCLUSIONS

According to data emerged from medical literature, the incidence of gastrointestinal complications ranges from 0.4% to 3.7%, with mortality ranging from 11% to 85% [14, 15, 28, 29]. The most recent and multidisciplinary review concludes that GI complications occur on average after 1.21% of cardiac operations and have an associated mortality of 34.1% [30]. These considerably high percentages impose an imperative for quick and accurate recognition of these entities should they occur. Concerning the role of CPB, application remains still controversial [18,19,20,31].

It is however, unanimously acceptable that identification of gastrointestinal complications after cardiac surgery requires high degree of clinical suspicion mainly because these patients are frequently sedated or under mechanical ventilation, thus often masquerading symptoms and signs of gastrointestinal complications. It is also important for the attending physician to be able not only to diagnose but also predict the complications before surgery. To this direction modern risk scores models have been recruited to assist physicians estimate the probability for the patient to develop a GI complication after cardiac surgery [32].

Conclusively, abdominal pain or tenderness in postoperative cardiac patients should alert every clinician for gastrointestinal complications. The fact that these complications may arise from different organs than the target organ of the operation accents the consultation with precise monitoring and regulation of all electrolytic disorders is crucial. Thus, an accurate evaluation of all electrolytic deficiencies is required. It is also important to stress that the diagnosis of a possible ileus should be performed early as it may impose an imperative for quick and accurate recognition of these entities. The ileus may supervene in a small proportion of patients after a cardiac operation, and the recovery of intestinal function may be hampered.

REFERENCES

REFERENCES (Continued)


