New arrhythmias after non-cardiothoracic surgery

Look for sepsis, among other causes

Postoperative arrhythmias are a problem that most doctors associate with cardiothoracic surgery, but they may also complicate major abdominal surgery. The incidence depends on the type of operation and the extent of cardiac monitoring after surgery (arrhythmias are more likely to be detected in patients with continuous monitoring as opposed to intermittent monitoring). Rates ranged from 4% in a mixed cohort of patients having major general, vascular, and orthopaedic surgery to 20% in patients having elective colorectal surgery.¹⁻² Most of the arrhythmias are atrial in origin.¹⁻²

Arrhythmias are associated with a longer postoperative stay and increased mortality,³⁻⁴ but few papers deal with postoperative arrhythmias, and their methodological quality is poor, with only a handful of prospective series. This contrasts with the considerable amount of work done on other complications of major abdominal surgery, such as anastomotic leakage.

Most patients who develop an atrial arrhythmia after major non-cardiothoracic surgery revert to sinus rhythm, often with no anti-arrhythmic intervention.¹ Indeed, atrial arrhythmias rarely cause severe haemodynamic compromise or death. It is tempting to dismiss them as transient, self limiting consequences of the physiological response to surgical trauma. However, mortality is higher in these patients because of the association with underlying complications such as myocardial infarction, respiratory failure, or sepsis in up to 80% of cases.¹⁻³⁻⁵ The arrhythmia often resolves if the underlying cause is promptly identified and treated.

Two large prospective series have reported arrhythmias in patients having non-cardiac surgery. More than 25 years ago Goldman published a prospective series of 916 patients undergoing major non-cardiac surgery, of whom 35 developed a postoperative supraventricular arrhythmia.¹ In 29% of these, an acute cardiac event was thought to be the main precipitant. Importantly, from a surgeon's standpoint, major infection was thought to be the precipitant in almost as many patients (26%). Metabolic derangements such as hypokalaemia were present in 23% of the patients with arrhythmia but were identified as the principal cause of the arrhythmia in only 3%. Goldman concluded that new postoperative supraventricular arrhythmias should trigger a thorough search for remediable underlying problems.

More recently, Polanczyk and colleagues published prospective data from a series of more than 4000 patients undergoing major non-cardiac surgery.³ The onset of a supraventricular arrhythmia was associated with myocardial infarction in 4% of patients, bacterial pneumonia in 7.5%, and wound infection in 8.5%. This shows that sepsis is at least as likely as an acute cardiac event or an electrolyte abnormality to be the underlying precipitant of a supraventricular arrhythmia. Although the cohort included several patients having thoracic surgery, non-vascular abdominal surgery was an independent predictor of supraventricular arrhythmia. The findings are relevant to general surgeons.

Mortality from sepsis (a clinical syndrome defined by the presence of infection and a systemic inflammatory response⁶) and septic shock (a state of acute circulatory failure characterised by persistent arterial hypotension unexplained by other causes⁶) has remained static for years. The surviving sepsis campaign aims to raise awareness of the diagnosis and treatment of sepsis.⁷ The campaign's ultimate goal is to reduce mortality from sepsis by 25%. Early identification and intervention is essential to maximise the prospects of successful treatment. In about half of patients undergoing general surgery who develop an arrhythmia, the underlying precipitant is not identified for another 12-24 hours.⁵ Instead, the tendency is to focus solely on managing the arrhythmia and to neglect the search for a cause. If the precipitant is sepsis, this delay may prove crucial.

Patients with a new arrhythmia are often assessed initially by junior surgical staff. In the United Kingdom, the care of the critically ill surgical patient (CCRI SP) course includes elements on the management of arrhythmia. This course is currently taken at a relatively late stage in basic surgical training, but its contents would be useful for foundation level surgical staff.

In the United States, new arrhythmias after major abdominal surgery are usually managed by surgeons on the surgical intensive care unit. In the UK, surgeons usually refer patients with arrhythmias to medical doctors or anaesthetists for management. Their help may be needed for control of the heart rate or rhythm, but it is essential for the surgeon to consider, investigate, and diagnose any underlying surgical problem that may have triggered the arrhythmia. Increased awareness and education of junior surgical staff, and early involvement of senior surgical staff in the care of these patients, may avoid detrimental delay.

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- Goldman L. Supraventricular tachyarrhythmias in hospitalized adults after surgery. Clinical correlates in patients over 40 years of age after major noncardiac surgery. *Chest* 1978;73:450-4.
- Walsh SR, Oates JE, Anderson JA, Blair SD, Makin CA, Walsh CJ. Post-operative arrhythmias in colorectal surgical patients: incidence and clinical correlates. *Colorectal Dis* 2006;8:212-6.
- Polanczyk CA, Goldman L, Marcantonio ER, Orav EJ, Lee TH. Supraventricular arrhythmia in patients having noncardiac surgery: clinical correlates and effect on length of stay. *Ann Intern Med* 1998;129:279-85.
- Brathwaite D, Weissman C. The new onset of atrial arrhythmias following major noncardiothoracic surgery is associated with increased mortality. *Chest* 1998;114:462-8.
- Walsh SR, Thomas C, Manohar S, Coveney EC. Early management of atrial fibrillation in general surgical in-patients. *Int J Surg* 2006;4:115-7.
- Levy MM, Fink MP, Marshall JC, Abraham E, Angus D, Cook D, et al. 2001 SCCM/EISCM/ACCP/ATS/SIS International Sepsis Definitions Conference. *Crit Care Med* 2003;31:1250-6.
- Slade E, Tamber PS, Vincent JL. The Surviving Sepsis campaign: raising awareness to reduce mortality. *Crit Care* 2003;7:1-2.