Most anaesthetists have encountered the problem of a patient with severe cardiovascular disease placed on the next day’s operating list by the surgeon who has told the patient that they will receive regional anaesthesia “as it is safer”. However, whilst the physiological and clinical benefits of regional techniques for patients with respiratory disease are well established, their role in patients with cardiovascular disease is less clear. The potential risks of compromising the coronary circulation with sudden hypotension or of precipitating congestive cardiac failure with fluid preloading must be taken into account when making a decision about the anaesthetic technique. What physiological and clinical evidence, therefore, is available to assist the anaesthetist?

The haemodynamic effect of regional analgesia is dependent on the extent of sympathetic nervous system involvement and, hence, on the level of block achieved. A block below L3 does not affect the sympathetic system and the haemodynamic upset is minimal. Haemodynamic changes relate to the extent of involvement of groups of nerves supplying the peripheral vessels, the splanchnic bed (T5–L3) and the heart (T1–4). Block to T10 has a limited effect on the splanchnic bed and vasodilatation occurs mainly in peripheral vessels. However, block to T5 affects both splanchnic and peripheral flow, resulting in a marked decrease in peripheral resistance and a reduction in arterial pressure of at least 25%. In addition, at this level the sympathetic innervation of the adrenals is blocked and this reduces the amount of systemic catecholamines released. This is important, as it is thought that small arterioles respond to humoral rather than neural stimulation and unblocked adrenal output could produce compensatory vasoconstriction. Block of the cardiac sympathetic innervation results in a decrease in cardiac output, slowing of heart rate and decreased contractility. In healthy patients, the effect of this may not be as dramatic as expected, but the effect in a patient with compromised cardiac function would be severe.

Fluid preloading with either crystalloid or colloid has been standard practice for many years. Crystalloid infusion has been shown to produce an increase in circulation blood volume [1]. The value of fluid preloading before spinal anaesthesia in an elderly population has been questioned by Coe and Revanas [2] who found no difference in the incidence of hypotension in patients receiving preloading with Ringer lactate 0, 8 or 16 ml kg⁻¹. The preferential use of vasoconstrictors rather than fluid loading has been advocated in this group of patients [3]. However, in a group of patients with coronary artery disease, the potential for producing tachycardia which is associated with some vasoconstrictors may be undesirable. The most important factor in maintaining good coronary flow is avoidance of rapid changes in either heart rate or arterial pressure.

In a recent review of the prevention and treatment of hypotension associated with regional analgesia, McCrae and Wildsmith detailed the advantages and disadvantages of the various methods of controlling hypotension [4]. Overall, the authors came down in favour of the use of vasopressors in this situation. However, they noted that much of the published work in this area relates to obstetric patients and they highlighted the need for well designed comparative studies of the methods of preventing hypotension.

A haemodynamic study of 10 patients [5] with stable mild angina who received extradural block to a mean level of T9 demonstrated a small increase in left ventricular (LV) ejection fraction and decreased segmental wall motion abnormalities (SWMA) when no fluid load was given. Addition of a fluid load of lactate 500 ml increased the SWMA to near control values. The authors suggested that decreased LV loading was beneficial to myocardial function in these patients. In contrast, a study of 10 patients [6] with coronary artery disease receiving an extradural block to T6–12 with colloid infusion to restore arterial pressure to control values demonstrated a significant increase in SWMA in some patients. The authors attributed this to decreased coronary perfusion as a result of the hypotension which accompanied induction of extradural block.

The benefits of regional analgesia or general anaesthesia in patients with cardiovascular disease has been assessed using various measures of outcome including mortality, postoperative cardiac events (infarction or failure) and more recently the development of myocardial ischaemia. If mortality is taken as a measure of outcome, there is some evidence to suggest that regional analgesia may reduce early postoperative mortality [7]. Most of these data related to hip surgery, and after the initial improvement the long-term outcome was not different [8]. The incidence of postoperative myocardial infarction has been reviewed recently by Mangano [9], who found little evidence to suggest a difference in reinfarction rate between regional and general anaesthesia. However, in a study of general and vascular surgery patients receiving either extradural...
or general anaesthesia, Yeager and colleagues [10] demonstrated a marked reduction in the incidence of postoperative cardiac failure in the extradural group.

Recent studies of cardiac risk have moved to the detection of perioperative ischaemia which is likely to precede major cardiac events. Ischaemia rates of up to 60% have been demonstrated in patients known to have cardiovascular disease before operation [9]. In this issue, Christensen and colleagues [11] present a small study of 14 “at risk” patients undergoing minor surgery under spinal analgesia who had pre- and postoperative Holter monitoring. They found a high incidence of ischaemia and those patients with preoperative ischaemia tended to have ST segment changes of longer duration and greater severity. In addition, three of seven patients who had no changes before operation developed significant postoperative ST depression. These findings are consistent with those of larger studies of general anaesthesia patients. They are in agreement also with the study by Marsch and colleagues [12], who monitored 51 unselected patients receiving spinal or extradural analgesia for hip surgery. The results of these two studies are interesting, but do not allow us to make the decision between regional and general anaesthesia. What is required are large controlled studies comparing the incidence of perioperative ischaemia and postoperative cardiac events in patients with cardiovascular disease receiving either regional analgesia or general anaesthesia.

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