COLORECTAL SURGERY FOR CANCER:
THE ANAESTHETIST'S CONTRIBUTION?

It would appear that patients undergoing surgical resection for colorectal cancer survive for longer if they are not given blood transfusion at the time of their operation (Burrows and Tartter, 1982; Blumberg, Agarwal and Chueng, 1985; Foster et al., 1985). Apparently, this is not an observation of minor clinical importance; blood transfusion may be one of the crucial factors in determining outcome. Differences of the order of 4:1 in survival rates in patients receiving and not receiving transfusion have been reported (Fielding, 1985). A relationship between the amount of blood transfused during operation and the incidence of leakage from the colon suture line in the postoperative period has been demonstrated and, furthermore, this relationship was significant at the 0.1% level (Whitaker and Dixon, 1970).

Of course, it may be argued that those patients with more extensive disease will require blood transfusion more often because a more radical operation is being performed. However, there is no evidence that this is so (Fielding, 1985). Experience with renal transplantation suggests that blood transfusions can cause immunosuppression. This would make it possible for tumours, which otherwise would have been held in check by the body's defence mechanisms, to grow. However, there is no certainty about the exact mechanisms involved (Kirschenbaum and Schanzer, 1983).

Whatever the immunological responses involved, it is obvious that anaesthetists can play a useful part in reducing the need for blood transfusion during colorectal surgery. An obvious contribution lies in ensuring treatment of the patient, when time allows, with iron and other appropriate haematinics in the preoperative period. During the operation itself, too, plasma volume expanders, rather than blood, may be used to make good losses of blood volume. In this connection it should be borne in mind that a decrease in haemoglobin concentration to 10 g dl\(^{-1}\) may improve tissue oxygen delivery, a fact which is well known to those who, during cardiac surgery, strike a balance between the maintenance of oxygen supply on the one hand and, on the other, the improved tissue perfusion which can be achieved by reducing the viscosity of the blood.

Obviously, an anaesthetic technique which decreases arterial pressure will make a contribution to the reduction in blood loss, and in this connection there is much to be said for the use of spinal or extradural techniques, especially if combined with light general anaesthesia administered through a tracheal tube which can be passed following the topical application of appropriate local anaesthetic drugs to the larynx and trachea. It is even possible to allow the patient to breathe spontaneously with such a technique if this is felt to be of value (Aitkenhead, Wishart and Peebles Brown, 1978).

The alternative technique of anaesthesia involving nitrous oxide, oxygen and a neuromuscular blocking drug, together with sufficient analgesic drug, usually given as some kind of neuroleptanalgesia, is certainly less satisfactory from the point of view of preventing blood loss but is, of course, free from the risk of the neurological complications of spinal or extradural anaesthesia. However, such a technique of anaesthesia involves the maintenance of relaxation of the abdominal wall right up to the point at which the peritoneum is closed. With such a degree of myoneural blockade, effective spontaneous respiration is impossible during the procedure. In patients who have received a non-depolarizing myoneural blocker, paralysis is antagonized at the end of the operation.

It has been suggested that the use of neostigmine, under such circumstances in such patients, brings with it an increased risk of colon suture line dehiscence (Aitkenhead, 1984).
Indeed, this has been appreciated as a risk since 1970 (Ball, 1970). In this study of 87 patients undergoing colorectal surgery, 36% of those given neostigmine at the conclusion of the operation developed a suture line leak, whereas only 4% of those in which this drug was not used had such a complication. This author also noted that the administration of atropine with neostigmine did not prevent the vigorous contraction of the large bowel induced by this latter drug. Nor was glycopyrrolate any more effective (Child, 1984).

Suture line dehiscence, however, is a complication which appears some days after operation. At first sight, therefore, it might be assumed that neostigmine could not be responsible. However, if it is remembered that large bowel motility does not return for at least 48 h after surgery, it might be that any weakness in the suture line would not become apparent until bowel contractions had resumed (Rennie et al., 1980).

In addition to its effect in producing pressure waves, neostigmine reduces mesenteric blood flow and may, possibly, lead to the development of ischaemic areas in the suture line—areas which fail to unite, with the result that leakage occurs subsequently (Aitkenhead, 1984).

The critical experiment, however, does not seem to have produced a clear cut result for, although Aitkenhead, Wishart and Peebles Brown (1978) found that the incidence of anastomotic dehiscence following resection of the colon in patients receiving general anaesthesia with a nitrous oxide, oxygen, relaxant technique was 23% as compared with 7.4% in patients whose operation had been performed under spinal nerve block with supplementary light general anaesthesia, the difference in breakdown rate was not statistically significant.

Perhaps, if an antagonist is to be used, edrophonium is preferable. It is true that its actions on the bowel do not seem to have been investigated, but it has less action on the cardiac vagus than has a corresponding dose of neostigmine (Baird, Bowman and Kerr, 1982). Also, the effect by which it antagonizes neuromuscular blockade is not solely dependent on anticholinesterase activity. It also gives rise to multiple firing of the endplate mechanism (Blaber, 1972) and, in large doses, causes a biphasic potentiation of twitch tension (Barber et al., 1976) and has, apparently, a greater prejunctional effect at the motor nerve endings than has neostigmine (Harper, Bradshaw and Healy, 1984). There is, therefore, at least a chance that it would be less liable to cause unwanted bowel contractions.

Of course there is also the option of using a rapidly eliminated myoneural blocker such as atracurium or vecuronium, in the hope that spontaneous reversal of the myoneural block will occur in an acceptable time, without the need for antagonism.

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REFERENCES