FRACTURE OF A FLOAT CATHETER

A case report

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SUMMARY

Fracture of a balloon-tipped flow-directed catheter is described. The circumstances associated with the fracture are discussed, but no definite cause could be determined.

The advent of multi-channel float catheters marks the latest advance in invasive cardiovascular monitoring. All invasive monitoring techniques are associated with undesirable complications and this report deals with a complication not described previously.

CASE REPORT

A 60-year-old colored female patient underwent exploratory laparotomy for intestinal perforations secondary to diverticular disease. During surgery the patient became shocked and this continued into the period after operation. In the intensive care unit she was ventilated mechanically and required high doses of dopamine to maintain her arterial pressure. It was decided to monitor the pulmonary wedge pressure.

A cut-down was performed in the right antecubital fossa and a thermodilution float catheter was inserted under direct vision and passed easily to the 40-cm mark. Here moderate resistance was encountered, but, by manipulating the catheter, the resistance was overcome and further insertion was easy. The position of the catheter was followed by observing the pressure profile on an oscilloscope. An acceptable waveform could not be obtained after several attempts at positioning the catheter, so the catheter was passed to the 65-cm mark, secured, and an x-ray was taken. This revealed that the tip of the catheter was in the inferior vena cava. In view of the difficulties encountered with this catheter, it was decided to remove and reinset it. The catheter was withdrawn easily and was then found to be fractured 0.5 cm proximal to the c.v.p. opening (fig. 1). Fortunately, the distal part of the catheter was still attached to the proximal part by the wires leading to the thermistor, and the two parts did not separate in the great veins. A new catheter was introduced through the same venous site and passed readily into a pulmonary wedge position.

DISCUSSION

Introduction of float catheters into the venous system can be achieved by utilizing either a central or a peripheral vein. Whilst offering some advantages, blind cannulation of a central vein can result in ectopic catheter placement (McNabb, Green and Parker, 1975). Advancement of a catheter from a peripheral vein can be difficult if resistance is encountered and the possibility of cutting a catheter by withdrawing it through the needle is well known and avoidable. In our patient the float catheter was inserted via a cut-down and a needle was not employed. Fracture occurred presumably when the catheter was manipulated past the resistance at 40 cm. Subsequently, the balloon failed to inflate, resulting in its inability to float the catheter through the right heart. Also, the pressure record would be obtained from the level of the fracture. Although it is possible that recurrent angulation of the catheter close to the c.v.p. opening occurred when the catheter was manipulated past...
the resistance at 40 cm, attempts to reproduce the fracture by this mechanism were unsuccessful.

Relatively few serious complications have been associated with the introduction of float catheters. Whilst rupture of the inflated balloon is not an uncommon event (Buckbinder and Ganz, 1976), there are no reports of embolic sequelae from the small amount of gas released. Passage of the float catheter through the right heart is usually uneventful although premature ventricular contractions are observed in about 15% of patients. These are often single and are very rarely associated with “serious sustained arrhythmias” (Swan et al., 1970). However, persistent atrial arrhythmia (Geha, Davis and Lappas, 1973) and ventricular fibrillation (Cairns and Holden, 1975) have been reported. The ability of long pliable catheters to tie themselves into knots when advanced blindly is well recognized. Intracardiac knotting of a float catheter has been described: by itself (Lipp, O'Donoghue and Resnekov, 1971; Daum and Schapira, 1973), with another catheter (Swaroop, 1972, and with a papillary muscle (Schwartz and Garcia, 1977). Advancement of the float catheter into a wedge position has resulted in haemoptysis (Lapin and Murray, 1972) and pulmonary haemorrhage (Chun and Elstad, 1971) which was fatal in one patient (Golden, Pinder and Anderson, 1973). It is thought that perforation of a pulmonary artery occurs and this is most likely in patients with pulmonary hypertension and who are receiving anticoagulant therapy, particularly if the catheter is advanced with the balloon deflated and the catheter tip unprotected.

If the catheter tip lies too peripherally in a pulmonary artery, distal pulmonary ischaemia and subsequent pulmonary infarction are possible (Foote, Schabel and Hodges, 1974; Colvin, Savage and Lewis, 1975). To prevent such complications it is suggested that: the balloon be inflated only to take a measurement and deflated immediately; the catheter tip be placed in a central pulmonary artery and floated peripherally for each reading; and intracardiac loops of catheter be avoided since this will reduce the tendency to spontaneous peripheral migration of the catheter tip.

The occurrence of thrombus formation around the catheter is well recognized following prolonged catheterization (Becker and Martin, 1972). What is recognized less well is that the presence of a catheter in the right heart can produce aseptic thrombotic vegetations on the tricuspid and pulmonary valves. The reported incidence of these endocardial lesions varies between 3.4% (Pace and Horton, 1975) and 9% (Greene, Fitzwater and Clemmer, 1975). Infection can occur of both thrombus (Becker and Martin, 1972) and endocardial vegetations (Greene, Fitzwater and Clemmer, 1975).

REFERENCES


FRACTURE OF A FLOAT CATHETER

FRACTURE D'UN CATHETER A FLOTTEUR

RESUME
On décrit dans cet article le cas d'une fracture de cathéter ayant une extrémité arrondie et à débit dirigé. On y décrit les circonstances dans lesquelles la fracture s'est produite, mais on n'a pu déterminer aucune étiologie concluante.

BRUCH EINES SCHWIMM-KATHETERS

ZUSAMMENFASSUNG
Die Fraktur eines in Flussrichtung eingesetzten Katheters mit Ballonspitze wird beschrieben. Die mit der Fraktur zusammenhängenden Umstände werden beschrieben, doch konnte keine definitive Ätiologie bestimmt werden.