A New Complication of Rashkind Balloon Septostomy

Rashkind and Miller (1966) have introduced a new method of treatment for infants with transposition of the great arteries. In order to survive, these children are dependent on some degree of communication between the systemic and pulmonary circulations. Surgical procedures to produce such a communication have a high mortality and Rashkind devised a technique whereby a double lumen catheter with an inflatable balloon is introduced into the left atrium through a forearm ovale and the balloon then inflated with radiopaque dye and sharply withdrawn from the left to the right atrium, thereby tearing the atrial septum and allowing increased mixing between the circulations.

I had performed 18 balloon septostomies in this Unit between August 1966 and January 1970. There were two early deaths (that is within 24 hours of the procedure). This 11% mortality is comparable to that in other series (Rashkind and Miller, 1968; Singh, Astley, and Burrows, 1969; Venables, 1970) in which the combined early mortality is 17% in 95 cases. Initially the Edwards Company balloon catheter was employed, but for the past three years the Rashkind catheter (United States Catheter and Instrument Corporation) has been used.

Case Reports

Case 1. On 13 February 1970, after satisfactory tearing of the septum in a 7-day-old infant (weighing 2721 g.) with transposition of the great arteries, the radio-opaque dye could not be removed from the balloon. Further injection of dye showed that the dye was entering the right atrium below the level of the balloon. As the balloon could not be removed in the usual way it was punctured by passing a fine needle into the right atrium through the chest wall in the fourth right intercostal space. The infant tolerated this procedure well and there was no evidence of tamponade following it. The result of the septostomy was satisfactory and the baby has made good progress.

When the balloon catheter was withdrawn, it was found that the proximal tethering of the balloon had slipped upwards above the holes in the catheter through which the dye should have drained from the balloon (Fig.).

Case 2. On 19 February 1970 a 17-day-old infant (weighing 2721 g.) with probable transposition of the great arteries was admitted in severe heart failure. The heart failure was treated medically, the diagnosis confirmed by angiography, and again balloon septostomy performed. The same complication followed and was dealt with in the same way. On withdrawal the catheter showed the same appearances as in the first case. This infant's condition, which was critical at the beginning of the procedure, deteriorated, and he died two hours after the catheterization. Necropsy confirmed the diagnosis and showed that there was a satisfactory tear in the atrial septum 1 cm. in diameter. There was also a haemopericardium following the needleling of the right atrium.

The tearing of atrial septum by the balloon must produce a considerable strain on the proximal tethering of the balloon. The complication of the dye being trapped in the balloon due to movement of the proximal tethering, could however be avoided by making an additional hole in the catheter close to the distal tethering of the balloon.

Comment

Venables (1970) recently reviewed the recorded complications of balloon septostomy, but made no reference to the problem experienced in these two cases. W. J. Rashkind (personal communication 1970) has experienced it and dealt with the situation inserting another small gauge catheter with a stiff stillette wire with a sharp tip recessed 1 cm. inside the catheter. The catheter tip was placed in the thoracic inferior vena cava and the wire extruded beyond the catheter tip until it was just at the right atrial-inferior vena cava junction. The balloon was then pulled towards the inferior vena cava until it was pricked by the stillette wire. This resulted in deflation and permitted removal of both catheters.

Following notification of these difficulties, the United States Catheter and Instrument Corporation are modifying the catheter which should be available later this year.

Summary

Atrial septostomy by the Rashkind balloon technique was performed in two infants with transposition of the great vessels. In both cases the dye could not be removed from the balloon at the end of the procedure and it was therefore impossible to withdraw the catheter from the heart. Deflation of the balloon was achieved in each case by punct-
turing it with a fine needle introduced into the right atrium through the chest wall.

My thanks are due to Mr. David Watson who carried out the needling of the balloon in Case 1 and to Dr. Clive Bowkett who helped in the care of these infants.

REFERENCES

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Addendum
Since submission of this report, two further examples of the same complication have been described elsewhere (Ellison et al., 1970).

REFERENCES

Association of Hypoglycaemia with Cardiac Enlargement and Heart Failure in Newborn Infants
A retrospective review of the chest x-rays of infants with hypoglycaemia seen in this hospital has shown that hypoglycaemia in the newborn is frequently associated with cardiac enlargement, sometimes with signs of heart failure.