Shunt catheter impacted in the vena cava

Case report

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A shunt-dependent patient had an atrial catheter firmly adherent in the superior vena cava. Thoracotomy was required for its removal.

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Ventriculoatrial shunting is a widely used and effective method of treating hydrocephalus. However, there are now many reports of both early and late complications of the procedure, including obstruction of the vena cava. We report a further late complication which would be hazardous if it were not recognized at the time of revision or removal of the distal catheter.

Case Report

This 19-year-old woman had been diagnosed by bubble ventriculography as having hydrocephalus when aged 4 months. A Spitz-Holter ventriculoatrial shunt was inserted in 1959; she had required revision of the shunt for blockage at 3 and 7 years of age. The patient remained well with the exception of near blindness in the left eye. One week before this admission she had an infection of the upper respiratory tract, with vomiting, headache, and intermittent drowsiness.

Computerized tomography showed hydrocephalus that did not involve the fourth ventricle, suggesting stenosis of the aqueduct. The valve was faulty, and following replacement she recovered satisfactorily.

Seven days later, cerebrospinal fluid leaked from the lower end of the wound. The new Spitz-Holter valve was found to have eroded through the wall of the distal catheter. The tubing between the scalp and the neck wounds was replaced, and the original atrial catheter retained. Five days later she developed septicemia (Staphylococcus pyogenes).

Intravenous cloxacillin did not sterilize the blood, and an attempt was made to remove the shunt system, 15 days after the second revision. The distal catheter was firmly adherent and could not be removed. The ventricular fluid was drained to the exterior for 48 hours, following which a Pudenz ventriculoperitoneal shunt was inserted. Five days later, the superior vena cava was explored through a midline thoracotomy. Cardiopulmonary bypass was available but was not required. The catheter was found to be embedded in a large lump of calcified material which was adherent to the vein posteriorly. It was possible to remove the catheter completely through a small incision in the vena cava. The calcified material could not be removed without replacing the vein and was left in situ. Postoperatively, the patient made an uninterrupted recovery.

Discussion

This case suggests that great care must be taken when revising or removing the distal catheter of a ventriculoatrial shunt. If it does not slide easily with light traction, the temptation to pull hard must be resisted.

See also the previous paper in this issue (Carbonin G: Migration of subdural atrial shunt catheter into the pulmonary arteries. Case report). — Editor
lest a calcified plaque be pulled out together with the posterior wall of the superior vena cava. Unlike the perforations of the myocardium, which have been described,13 fatal hemorrhage would almost certainly follow this disaster. This possibility should also be remembered if graded skin traction7 is used in an attempt to remove a tethered distal catheter.

It is likely that this will become a more frequent problem because the patient described was one of the first to undergo ventriculoatrial shunting in Liverpool. Whether similar problems will occur with the more modern material used for shunt tubing will not be known for a further 20 years.

The operative findings in this case suggest that thoracotomy (with cardiopulmonary bypass facilities on standby) is the only safe way to remove a tethered distal catheter. Thoracotomy carries appreciable risks and therefore the catheter should only be removed for positive reasons, such as for infection, or pulmonary hypertension. In their absence, it should be tied off in the neck, secured, and left in situ.

Recent evidence has suggested that the complications of ventriculoatrial shunting are more serious than those of ventriculoperitoneal drainage.5,9 There is no evidence that the latter patients do less well, and there is some evidence in children that they require significantly fewer revisions.8 In view of this, it would seem safer to use ventriculoperitoneal shunting initially in the treatment of hydrocephalus, and to reserve ventriculoatrial shunting for refractory cases.

References


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