a patient with congenital short bowel and malrotation. J Pediatr Surg 1991, 26: 103-105.

8. Coran A. Nutritional support of the pediatric surgical patient. *In:* Pediatric Surgery. Eds Holder T, Ashcraft K, Philadelphia, WB Saunders, 1980, p 42.

9. Bryant J. Observations on the growth and length of the human intestine. Am J Med Sci 1924, 167: 499-520.

Jugular Vein Cannulation

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Establishment of venous access and the maintenance of an intravenous line is often difficult in extremely small and sick children. Occasionally peripheral percutaneous venous catheterisation is not successful because of previously punctured or thrombosed veins. In these cases it is necessary to attempt venous cannulation by venesection of basilic, median, cephalic, saphenous or jugular veins. We report our experience with cannulation of the jugular vein in extremely sick children.

Material and Methods

One hundred children needing jugular vein cut down were studied and results noted. Jugular vein cannulation was attempted in patients with: (*i*) no suitable peripheral veins for intravenous therapy; (*ii*) major surgical procedures where transfusions of large quantity of blood was expected; (*iii*) neonates requiring exchange transfusion where umbilical catheterisation was not possible.

Procedure: The patient was placed supine with the neck hyper extended and the head turned to the opposite side. After aseptic skin preparation local anesthetic with 1% xylocaine was administered. A transverse incision was made over the sternocleidomastoid at the junction of the middle and lower third. The external jugular vein was then identified. If the calibre was adequate it was cannulated. However, if the calibre was inadequate, the internal jugular vein was exposed by separating the sternal and clavicular heads of the sternocleidomastoid muscle with the help of right angle retractors. The vein was carefully hooked. To avoid skin contamination, a subcutaneous tunnel was made, and the catheter (No. 6 gauge feeding tube) tunneled into the main wound. The jugular vein was ligated distally with 3/0 catgut and a phlebotomy made and adequate length of catheter introduced so that its tip was in the mid superior vena cava. The catheter was secured with a ligature previously placed around the proximal portion of the vein. The skin incision was closed.

Results

One hundred patients underwent jugular vein cannulation. Their age ranged between 18 hours to 2.5 years. Eighty one per cent patients were less than 2 weeks old. The weight ranged between 1.3-12 kg.

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Received for publication October 24, 1990; Accepted April 29, 1991

Eighty five per cent of cases were less than 3.5 kg. The chief indications for jugular vein cannulation included extremely sick cases with lack of suitable peripheral veins for administration of fluids and drugs (60 cases), for exchange transfusion in neonates (31 cases) and prior to major surgery (9 cases). In 11 cases the external jugular and in 39 internal jugular vein was cannulated. Ninety one per cent of the cut down procedures were done on the right side. Ninety eight cases were done under local anaesthesia and 2 under general anesthesia. The minimum time taken for the procedure was 10 minutes and maximum time was 25 minutes, the average being 17 minutes. There was no failure in cannulation in any patient. The duration of cannulation ranged from 14-480 h; mean being 160 h. Fifty six cases received blood transfusion. Seventy per cent were administered 10% dextrose and the rest 5, 20 or 50% dextrose through this line.

Eleven patients had catheter related complications. Culture of the catheter tips in 6 cases showed *Staphylococcus aureus* and *Albus* in 3, *Escherichia coli* in 1, Klebsiella in 1 and *Candida albicans* in 1 patient. Of these, blood cultures were positive in 4; *Staphylococcus* grew in 2 and *Pseudomonas* in 2. In 2 patients, *Staphylococcus* (*S. aureus*-1, *S. albus-1*) was cultured from both the catheter tip and the blood. The other 2 grew different organisms from catheter tip and blood. Two cases with septicemia and disseminated intravascular coagulation had excessive bleeding from the cut down site, both the cases expired. (after 6 days and 16 days, respectively). One patient developed respiratory distress during the procedure, which improved on changing the position by removing the roll towel from under the shoulders. One case each developed seroma of wound and leakage of fluid at the IV site.

In 98 patients the catheters were removed once the patient recovered or immediately after death. However, in 2 cases, the catheter was removed due to catheter related complications. One patient had catheter related *S. albus* septicemia and high fever; removal of the cannula and antibiotics therapy led to control of infection. The other catheter was removed due to leakage at the IV site.

Discussion

Placement of central venous catheters is a safe procedure, can be performed in neonates and is useful for long term parenteral nutrition(1,2). To minimise the risk of infection and mechanical failure of the central line, we avoided drawing blood samples through this line as previously recommended(3,4). In cases where umbilical vein catheterisation was not feasible, we used jugular vein cannulation for exchange transfusions. Supraumbilical cannulation of the umbilical vein was not done. Ninety one per cent of cut down were done on right side, because of direct path to the superior vena cava and danger of thoracic duct injury on the left side(1). As such sialastic tubes are ideal, but we used feeding tubes. The central venous line should be cleaned every other day with Betadine solution. Other complications related to jugular vein cut down include cardiac arrhythmia, pulmonary edema, venous thrombosis, hydrocephalus and superior vena cava syndrome(1,3). The major complications of central venous cannulation are infection(3) and bleeding from cut down site. The treatment of infection was heavy antibiotics initially, and if no response then removal of the catheter.

REFERENCES

1. Kaplan MS, Mares A. Quintan P, *et al.* High caloric glucose nitrogen infusions: Post-operative management of neonatal infants. Arch Surg 1969, 99: 567-571.
2. Mulvihill SJ, Fonkalsrud EW. Complications of superior versus inferior vena cava occlusion in infants reviving central total parenteral nutrition. J Pediatr Surg 1984, 19: 752-757.
3. Ogata ES, Schulman S, Raffensperger J, Luck S, Rusnak M. Caval catheterisation in the intensive care nursery: A useful means for providing parenteral nutrition to the extremely low birth weight infant. J Pediatr Surg 1984, 19: 258-262.
4. Coran AG. Nutrition of the surgical patients. *In:* Pediatric Surgery, 4th edn. Welch KJ, Randolph JG, Rvitch MM, *et al.* Chicago, Year Book Medical Publishers 1986, pp 96-108.

Unusual Presentation of Gastroesophageal Reflux with Corpus Callosum Agenesis, Cleft Palate and Mental Retardation

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Congenital anomalies of upper gastrointestinal tract (GIT) commonly present with frothing and persistent vomiting. We had a neonate who presented with recurrent apnea and cyanosis. On thorough investigation to our surprise the barium studies revealed presence of gastroesophageal reflux (GER). This patient also had other congenital anomalies like agenesis of corpus callosum, hiatus hernia, cleft of soft palate and mental retardation.

Case Report

A 28-day-old male infant born of nonconsanguinous marriage was delivered at full term and weighed 3 kg. He was admitted on 28th day of life with a weight of 2.2 kg and complaints of respiratory distress, feeding difficulties, regurgitation of feed and recurrent apnea. He was treated at Ahmedabad without much improvement. On admission to our hospital, examination revealed cleft of small palate, recurrent apneic spells with cyanosis, bradycardia and evidence of bronchopneumonia which was treated with antibiotics.

However, difficulties in feeding, apnea and cyanosis persisted and the patient was investigated. Apneic spells did not respond to aminophylline and there was no tracheoesophageal fistula on dye studies. Echocardiogram was normal. CT scan to rule out CNS anomalies as a cause of recurrent apnea, revealed agenesis of corpus callosum (*Fig. 1*). Subsequently, barium esophagogram showed Grade IV GER.

Medical treatment in the form of antacid, ranitidine and metoclopramide was given. In view of severity of GER and possibility of associated anomaly, the child was operated (Nissen fundoplication with repair of associated sliding hernia), following which the child was free of all symptoms for a period of 2 months. The above

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Received for publication November 8, 1990; Accepted March 25, 1991