

**Summary**

In 67 female children receiving therapeutic prednisone nuclear sex determinations were carried out before and during therapy.

In all 67 patients a reduction of the sex-chromatin incidence was noted.

In 12 patients who were studied after therapy was stopped the incidence of sex chromatin was found to return to the normal female range.

In six patients in whom the smears were studied at intervals of four days for 32 days during therapy the sex-chromatin incidence showed a rapid initial fall noticed within the first

four days, and then minor fluctuations without further fall during the continuation of therapy.

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**Direct Spinal Anaesthesia for Repair of Myelomeningocele**

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It is now established practice in many of the centres dealing with cases of spina bifida cystica to undertake closure of the lesion within a few hours of birth. This often entails an emergency operation, and a duty anaesthetist who may have little practical experience in dealing with the neonate is presented with a newborn and often premature child to anaesthetize for a major operation in the face-down position.

It is not proposed here to discuss the ethics, economics, and philosophy of operating on these children—I believe, with others (Sharrard, 1963), that operation within the first few hours of life is, at the present time, the correct treatment in cases of myelomeningocele or myelocele.

Operative mortality in these cases is remarkably small, but should be further reduced by: (1) the maintenance of an even body temperature during operation by the use of some form of external warmth to the child (Calvert, 1962); (2) the accurate replacement of blood during operation as it is lost; and (3) avoiding general anaesthesia, which can be technically difficult, and therefore hazardous in inexperienced hands.

Local infiltration anaesthesia is widely used by many surgeons, and has been satisfactorily used by me on numerous occasions, but it has the disadvantages of occasionally producing subcutaneous haematoma formation and inadequate anaesthesia around the flanks owing to the limitation in the amount of local anaesthetic solution that babies will tolerate.

The method of "direct spinal anaesthesia" described below has been used by me during the past year in 26 cases operated on for myelomeningocele situated in the common sites between the lower thoracic region and the sacrum.

**Method**

The child, who has not had any form of premedication, is placed prone on some form of warm mattress laid on the operating-table, with a nurse comfortably seated at the head to suckle the child if necessary and to ensure that the airway is kept clear under the towels. A monitoring thermometer lead is placed in the child's rectum and a satisfactory intravenous drip must be running. In this unit an umbilical catheter is

inserted in the umbilical vein, and this route permits the rapid administration of blood during operation should this become necessary.

A bacterial culture is taken from the surface of the lesion in order to determine drug sensitivities should evidence of meningitis present in the post-operative phase. The child's back and the surface of the lesion are prepared with an aqueous chlorhexidine solution. The tincture is used if the medullary plate is covered by an intact membrane.

With a small trocar-pointed blade a puncture wound is made in the peripheral membranes in the midline above the exposed medullary plate. This causes a release of cerebrospinal fluid from the sac and from deep to the medullary plate, so allowing

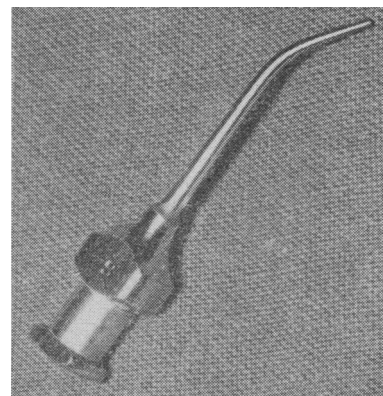


FIG. 1.—Angled Eynards connector.

the latter to lie against the posterior aspect of the vertebral bodies. This small incision usually evokes a transient cry from the child, so demonstrating that the tissues surrounding the lesion are not entirely anaesthetic.

An angled Eynards connector (Fig. 1) attached to a 2-ml. syringe is inserted upwards through the puncture wound, and thus deep to the dura, along the posterior aspect of the spinal cord in the subarachnoid space. The tip of the connector lies about 2 cm. above the upper limit of the exposed medullary plate, and to avoid puncturing the cord the tip is angled

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towards the posterior aspect of the vertebral canal (Figs. 2 and 3).

At this point 1.5 ml. of 1% lignocaine is injected. Usually about 25% of the injected solution leaks back out of the puncture wound during the course of the operation. After about five minutes the operation is started. In this the neural plate is always preserved, and the procedure lasts less than one hour.

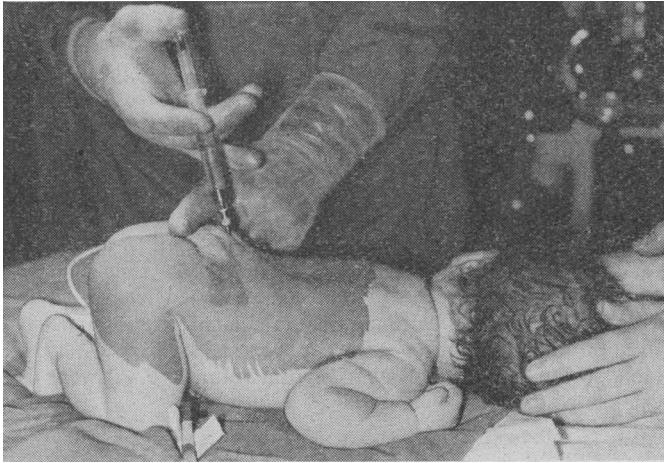


FIG. 2.—Position of the Eynards connector having been inserted through the peripheral membranes of the lesion.

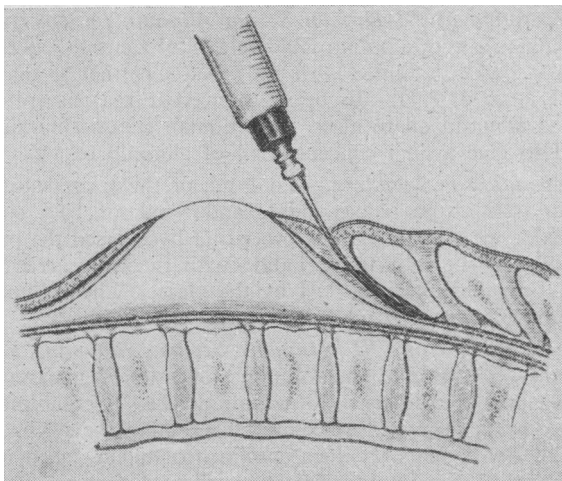


FIG. 3.—Diagrammatic sagittal section to show position of connector-tip in relation to membranes and spinal cord.

### Results

This method has been used in 26 cases of myelomeningocele operated upon by me. The series was unselected within the following limits. The lesions were all open myelomeningoceles or myeloceles necessitating immediate operation—the children's ages ranging between 2 and 41 hours. An arbitrary age limit

of 48 hours has been used, as it can be shown that inevitable infection on the surface of the lesion becomes well established in the tissues of the lesions; and a theoretical spread of this infection to healthy tissues higher in the vertebral canal is possible. Skin-covered lesions which do not demand emergency operation have not been included in this series, as it is important that the upper limit of the medullary plate must be accurately visualized in the placement of the introduced Eynards connector.

Within these stipulations there was no death within six weeks of operation, nor was there any evidence of ascending meningitis—all cases had a ventricular tap within four weeks of operation.

In every case satisfactory anaesthesia for closure was obtained, and was maintained for the duration of the operation, which averaged 35 minutes.

The blood-pressures in four cases were monitored during operation by means of the Neligan oscillometer (Ashworth, Neligan, and Rogers, 1959). This method accurately records the systolic, but not the diastolic, level in young babies. The systolic pressure dropped in these cases by 6, 8, 14, and 20 mm. Hg. The lowest pressures were recorded some 10 minutes after instillation of the anaesthetic, but in three the level had returned by the end of the operation. The greatest pressure drop—80 to 60 mmg Hg—occurred in a case in which there had been unusually heavy bleeding. When corrected by transfusion it rose to 75 mm. Hg by the end of the operation. One of the cases had a very extensive rachischisis between T9 and S2, and, like all the cases, there was no evidence of respiratory embarrassment or severe hypotension.

The method is easy and rapid, and all children returned to the ward awake and lively. In no case was there a demonstrable increase in the neurological deficit, and there were no post-operative complications which could be attributed to the anaesthesia. No death occurred in these children within six weeks of operation, and there was no selection of patients, other than that they were less than 48 hours old.

### Summary

A method of "direct spinal anaesthesia" for the closure of myelomeningoceles in babies under the age of 48 hours is described.

The method has proved safe and reliable in a series of 26 cases, with no apparent complications.

I wish to thank Dr. C. F. Scurr, of Westminster Hospital, who suggested to me that this form of anaesthesia might be developed for these cases, and Professor A. V. Neale, Miss Beryl Corner, and Dr. D. Burman, who allowed me to operate on patients under their care.

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