HYPERTENSIVE ENCEPHALOPATHY FOLLOWING UROLOGICAL SURGERY

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SUMMARY

This report describes severe hypertension with encephalopathy developing during recovery from anaesthesia for corrective urological surgery. A therapeutic regimen for the paediatric patient in hypertensive crisis is outlined.

 transient hypertension following urological surgery in children has been reported previously (Berens, Linde and Goodwin, 1966) but is usually not sufficiently severe to require specific therapy.

CASE HISTORY

A 14-month-old male was admitted to hospital with a 2-day history of irritability, vomiting and pyrexia (40.5°C). He had not voided urine in the previous 24 hours. On examination he was extremely irritable and dehydrated (weight 8.8 kg), with obvious abdominal distension. His temperature was 37.5°C, the pulse rate was 150/min and the arterial systolic blood pressure was 150 mm Hg measured with a sphygmomanometer and palpation of the radial artery. The bladder was palpable 3 cm above the umbilicus. Laboratory data included: blood urea nitrogen 64 mg%; blood creatinine 4.2 mg%; serum sodium 137 m.equiv/l; potassium 5.7 m.equiv/l; chloride 101 m.equiv/l.

Preoperative therapy and evaluation included suprapubic catheterization, kanamycin and ampicillin therapy for urinary tract infection and possible septicaemia, and hydration. Intravenous pyelography showed massive bilateral hydro-uretero-nephrosis, probably the result of a lower urinary tract obstruction. The presence of posterior urethral valves was confirmed later. Throughout the preoperative period the arterial systolic pressure was approximately 150 mm Hg.

Thirty-six hours after admission bilateral pyelostomies were performed. Pentobarbitone 30 mg and atropine 0.15 mg were administered by intramuscular injection 40 minutes before the induction of anaesthesia. Halothane, nitrous oxide and oxygen were administered first from a face mask and later through an endotracheal tube. The operation lasted 1 hr 40 min, during which the patient was in the prone position.

Systolic arterial pressure measured with a percutaneous Doppler apparatus was remarkably stable throughout and ranged from 106 mm Hg to 110 mm Hg.

The arterial pressure remained stable at 130/86 mm Hg in the first 30 min of the recovery period. The child regained consciousness rapidly, cried and moved vigorously. Over the next 70 min the arterial pressure increased sharply (fig. 1) to over 300 mm Hg systolic and 200 mm Hg diastolic and he became unconscious. Reserpine 0.3 mg i.m. and hydralazine 1.5 mg i.v. were given (fig. 1, point A). Within 30 min the arterial pressure decreased to 180/110 mm Hg. A further 0.5 mg of hydralazine i.v. (fig. 1, point B) resulted in a further decrease in arterial pressure to 130/80 mm Hg. As the blood pressure decreased, the child regained consciousness.

During the next 8 days the patient's arterial pressure gradually returned to normal and on periodic follow-up examinations it has remained approximately 90/60 mm Hg without medication.

DISCUSSION

The incidence of hypertension in the paediatric age group is small when compared with adults, ranging from 1.4% to 2.3% of the general population (Blaufox, 1971). At least 20% of these patients have essential or idiopathic hypertension, while a large proportion of the remainder have renal vascular or parenchymal lesions (Loggie, 1971). Hydronephrosis is often associated with hypertension and may be cured by relief of the obstructing lesion or by nephrectomy. The hypertension may present before, during or after surgery for the renal abnormality. Of 18 patients with postoperative

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hypertension associated with urological surgery (Berens, Linde and Goodwin, 1966), 17 were associated with hydronephrosis. The time of onset of the hypertension ranged from immediately after to 9 days after operation, but was usually on the first day and lasted 4 days on average. It was seldom so severe as to require treatment.

The aetiology of hypertension associated with hydronephrosis remains controversial. Belman, Kropp and Simon (1968) describe a case of unilateral hydronephrosis associated with high renal vein renin concentrations. Vander and Miller (1964) showed that acute ureteral obstruction in dogs may cause increased renin concentrations in renal vein blood. However, Palmer, Zweiman and Assaykeen (1970) found normal renin concentrations associated with hypertension and hydronephrosis. It has been postulated that hypertension associated with parenchymal renal disease may be due to prostaglandin production by the renal medulla. Water and electrolyte retention associated with impaired renal function may be of importance also.

This case reaffirms the association of hypertension and obstructive urinary tract lesions causing hydronephrosis. It also shows that severe hypertension causing encephalopathy may develop during recovery from anaesthesia and necessitate vigorous therapy. Blaufox (1971) has suggested that reserpine and hydralazine are the most commonly used drugs for the paediatric hypertensive emergency. However, they are relatively slow to act and ganglionic blocking agents or sodium nitroprusside might be preferable in particularly urgent situations. This child responded rapidly to the reserpine and hydralazine so that the more potent agents were not necessary. His subsequent course was similar to that described by Berens, Linde and Goodwin (1966), with the arterial pressure returning to the normal range in the postoperative period and remaining normal in follow-up examinations 1 year later.

REFERENCES


BOOK REVIEW


This modest book is outstandingly good and must be described as a highlight in the literature on anaesthesia. It should be in the possession of every anaesthetist and in every medical library.

Anesthetists reading this book will experience a deep sense of pride and wonder at the way their subject has developed during the last 30 years, and of gratitude to these three authors for presenting the progress of anaesthesia in such an attractive and concise form. There is no aspect of anaesthesia, whether clinical, technical, pharmacological, physiological or physical which is not included in this book. The reader will search in vain for practical details. Instead he will find an indication of the relevance of new work to the general practice of anaesthesia with critical statements about their likely long-term value. There are no illustrations, no graphs, and no tables, but every piece of new knowledge of any value is at least mentioned, with references so that further information can be obtained.

The contents are divided into four sections. The first one, the introduction, itself justifies buying the book. It consists of an essay written in the easy literate style for which the authors are known, highlighting the main innovations and problems of anaesthesia since 1940.

The other three sections each of about 40–50 pages (and 200–300 references) are titled “The application of physiological sciences to anaesthesia”, “Physical chemistry and the practice of anaesthesia” and “Scientific growth and developing clinical skills”.

Take for example the last section. Starting with Pauling's hypothesis of the mechanism of anaesthesia, the discussion is led into the implications of MAC, anaesthetic potency, pharmacokinetics, and biotransformation. Then comes an account of the application of these to, among other things, barbiturates, narcotics and local anaesthetics with diversions into drug interaction. The authors then switch to certain physiological aspects of anaesthesia. Neuronal and synaptic transmission, respiratory mechanics and gas exchange, circulatory and cardiac reflexes in a variety of circumstances, hepatic and cellular function, temperature control, and neuromuscular block. Lastly comes a brief account of some technical advances and the use of computers. All this in one section of 50 pages; but 360 references are given to this section alone! This is a unique book and is highly recommended.

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