may be expected to control a variety of infections caused by Gram-positive and Gram-negative organisms, without major toxic effects. Clinicians who require continuity of therapy may consider it an advantage that this cephalosporin is also available in parenteral form.

We wish to thank Squibb SA (Pty) Ltd, who supplied Cefril, which was used in this study.

REFERENCES


Propanidid for Anaesthetic Induction at Caesarean Section

M. C. MAHOMEDY, J. W. DOWNING, D. E. JEAL, A. J. COLEMAN

SUMMARY

In 50 healthy mothers scheduled for elective Caesarean section, anaesthesia was induced with propanidid (7 mg/kg body weight). Thereafter, ventilation was controlled with nitrous oxide, oxygen and muscle relaxants. A further dose of propanidid (1 mg/kg body weight) was administered 3 minutes after the initial injection of this drug, as a means of preventing maternal awareness during equilibration with the anaesthetic gas mixture.

The acid-base status of the mothers before the induction of anaesthesia, and at delivery, revealed a mild degree of respiratory alkalosis with a compensatory metabolic acidosis.

Umbilical cord blood gas results indicated the presence of significant fetal acidosis, both respiratory (mean pCO₂, Uv 46.3 torr (SD 11.3) and Ua 54.3 torr (SD 12.0)), and metabolic (mean base excess Uv=9 mEq/l (SD 4.2) and Ua=11.8 mEq/l (SD 5.0)) in origin.

The average umbilical cord blood oxygen tensions were Uv 25.9 torr (SD 10), and Ua 15.4 torr (SD 8.5); mean maternal to fetal base-excess gradients were Ma-Uv 4.1 mEq/l (SD 2.8) and Ma-Ua 6.5 mEq/l (SD 3.5).

Five mothers (10%) offered convincing evidence of factual recall during surgery, and 3 of these were aware of pain. Nausea and vomiting occurred in 5 patients and in 4 there were clinical signs of postoperative chest infection.

The degree of fetal biochemical asphyxia, and the incidence of maternal awareness during surgery, were significantly greater than previously reported when thiopentone was used for the induction of anaesthesia for Caesarean section.

The results obtained are discussed, and the conclusion is drawn that propanidid for anaesthesia appears to offer no advantage over thiopentone in obstetric practice.


Propanidid, unlike the shortest-acting barbiturates, is not cumulative. After intravenous injection into the maternal circulation, the drug readily crosses the placental barrier, and equilibration of mother and infant occurs rapidly. However, depression of the newborn is infrequently associated with propanidid administration.²

In a previous communication, the use of propanidid as the sole anaesthetic agent for Caesarean section was
described. Drug-induced depression of the newborn was rarely encountered, but the infants exhibited an undesirable degree of metabolic acidosis with the technique described. This finding was possibly associated with aorta-caval occlusion, since anaesthesia was conducted with the mother in the supine position.

In this study, propanidid was used for the induction of anaesthesia only, and Caesarean section was performed with the mothers tilted laterally.

**PATIENTS AND METHODS**

The 50 mothers, all in a lower socio-economic group, fulfilled the criteria for the 'clinically acceptable ideal case', as described by Crawford. The pre-operative management of the mothers, and the use of lateral tilt to obviate the undesirable effects of the aorta-caval obstruction by the gravid uterus, have been detailed elsewhere.

Anaesthesia was induced by injecting intravenously a mixture of propanidid (7 mg/kg body weight) and suxamethonium (2 mg/kg body weight). Doses of propanidid ranged from 400 to 600 mg, and suxamethonium from 100 to 150 mg. The rationale behind this induction and the precautions taken to prevent the aspiration of acid gastric content, have been considered elsewhere.

A further injection of propanidid (1 - 2 mg/kg body weight), was administered 3 minutes after the induction dose, in an attempt to ensure anaesthesia during equilibration of the maternal blood with the inspired concentration of nitrous oxide (65%).

The technique of anaesthetic maintenance prior to delivery of the fetus has been described. Thereafter, anaesthesia was supplemented with halothane 0,5% or ethrane 1%, and intravenous pethidine 50 mg.

Maternal arterial and fetal umbilical cord blood samples were drawn for blood gas analysis according to methods previously outlined. The clinical assessment of the newborn infants, using a modified Apgar score, and the management of the infants after delivery, have also been outlined in earlier communications.

**RESULTS**

The average maternal body weight in this series was 71.2 kg (SD 9.9). The mean dose of propanidid used for the induction of anaesthesia was 482 mg (SD 38.9) and the average supplementary dose was 118.5 mg (SD 49.5). The time from induction of anaesthesia to delivery of the infant ranged from 5 to 19 minutes (mean 10.6 min).

The mean, modified Apgar score (Apgar minus colour, A - C) at 2 minutes was 7.5. Five infants were mildly depressed (A - C 5 - 6/8) and 1 was severely compromised (A - C less than 5/8), 2 minutes after birth.

The results of maternal blood gas analysis appear in Table I. The mothers exhibited a mild degree of respiratory alkalosis with a compensatory metabolic acidosis, before induction of anaesthesia and at delivery.

The mean umbilical venous and arterial pH, pCO2, pO2, and base excess values are shown in Table II. They indicate the presence of significant fetal acidosis, of both metabolic and respiratory origin, in the majority of the infants. The mean pO2 of the umbilical venous and arterial cord blood samples was 25.9 and 15.4 torr, respectively.

**DISCUSSION**

Propanidid, a eugenol derivative, offers certain theoretical advantages to the obstetric anaesthetist, which include rapid degradation in the body, and a relative absence of drug-induced neonatal depression.

In this study, the clinical condition of the infants at birth, as judged by the modified Apgar score, was similar to that noted after thiopentone administration. The mean maternal blood gas status before induction and at delivery was also comparable to that reported after the use of thiopentone.
However, a marked degree of fetal acidosis, both metabolic and respiratory in origin, was encountered and it was significantly greater than that noted with thiopentone.1 Fetal oxygen tensions were also lower than those measured after thiopentone induction of anaesthesia.

Maternal to fetal base deficit gradients, which tend to increase when placental perfusion and fetoplacental exchange are compromised, were also appreciably wider, compared with those in our earlier thiopentone study.2

Maternal tachycardia, with or without hypotension, was frequently noted clinically in the first few minutes following the induction of anaesthesia with propanidid. The administration of this drug causes a marked fall in blood pressure which is dose-dependent.3,4 The hypotension occurring with propanidid is thought to be related to direct myocardial depression rather than to changes in systemic vascular resistance, and is likely to be associated with the drug’s quinidine-like action and local anaesthetic properties.5 A lowering of cardiac output after the administration of propanidid, with resultant hypotension, may have been responsible for the relative fetal biochemical asphyxia recorded here.

The high incidence of awareness during surgery (10%), with 6% of the mothers being aware of pain, was considerably greater than the 4% encountered with a thiopentone-nitrous oxide-relaxant anaesthetic technique.6 Although it has been suggested that patients experiencing unpleasant dreams may be on the brink of awareness,7 the dreaming reported by the mothers during this study was usually pleasant.

Nausea and vomiting were observed less frequently than they were previously when propanidid was used as the sole anaesthetic agent for Caesarean section.8 However, in our earlier study, anaesthesia was supplemented with ether, which might possibly account for the greater frequency at that time.

Postoperative respiratory complications occurred in 8% of patients, an incidence similar to that reported elsewhere.8,9

The total dose of propanidid used, 8-9 mg/kg body weight, was relatively large and provides a possible explanation for the undesirable degree of fetal biochemical asphyxia. However, an unacceptably high incidence of awareness during surgery was encountered, despite the administration of a supplementary dose of propanidid 3 minutes after the initial injection of the drug.

In summary, theoretically, propanidid has much to commend its use in obstetric anaesthetic practice. From our results, however, we conclude that propanidid appears to offer no advantage over thiopentone as an agent for the induction of anaesthesia for Caesarean section.

REFERENCES