

# Reasons for failure to administer antenatal corticosteroids in preterm labour

D. E. Ballot, N. S. Ballot, A. D. Rothberg

A retrospective review of 101 preterm infants delivered at Johannesburg Hospital was conducted to determine the use of antenatal corticosteroids (ACs). Overall there were 38 opportunities for the use of ACs of which 18 were missed. Of the remaining mothers, 32 presented in advanced labour, 22 presented with obstetric emergencies and 6 were managed as inevitable abortions. There was a significant association between lack of antenatal care and presentation in advanced labour. Therefore, although only 20% of mothers received ACs, there was no opportunity for their use in the majority of patients. The use of a safe and cost-effective measure such as ACs should not be ignored in a country with limited health resources. Better antenatal care as well as increased awareness among obstetricians is required to improve the situation.

*S Afr Med J* 1995; **85**: 1005-1007.

The administration of antenatal corticosteroids (ACs) has been shown significantly to reduce complications of premature birth, including hyaline membrane disease, bronchopulmonary dysplasia, patent ductus arteriosus, necrotising enterocolitis and intraventricular haemorrhage.<sup>1-5</sup> Failure to use ACs in appropriate circumstances therefore adversely affects neonatal outcome. It is our impression that ACs are used only infrequently in the mothers of preterm infants admitted to our neonatal unit. Reasons may include lack of awareness by the attending obstetrician, or clinical circumstances that preclude the use of ACs. In order to establish the frequency of AC administration in our unit, reasons for failure to do so, and whether there were any missed opportunities for the use of ACs, we reviewed the management of pregnancies that resulted in the birth of preterm infants requiring admission to the neonatal unit.

## Subjects and methods

The maternal records of all neonates with a birth weight < 1 500 g and/or gestational age < 32 weeks admitted to

---

Departments of Paediatrics and Child Health and Obstetrics and Gynaecology, Johannesburg Hospital and University of the Witwatersrand, Johannesburg

D. E. Ballot, PH.D., F.C.P. (PAED.)

N. S. Ballot, F.C.O.G.

A. D. Rothberg, PH.D., F.C.P. (PAED.)

the Johannesburg Hospital neonatal unit between 1 June 1991 and 1 June 1993 were considered for inclusion in the review. Cases referred from other hospitals, those who delivered before arrival and those with incomplete records were excluded. Maternal information was obtained in respect of age and parity, booking status, reason for admission, phase of labour, extent of cervical dilatation on admission, rupture of membranes and details of obstetric management. Particular note was made of the use of ACs. A value judgement was made as to where it would have been appropriate to use ACs. On the basis of AC efficiency's depending upon the required number of doses being given over a minimum period of time, a 'missed opportunity' constituted failure to administer ACs to a mother who had been admitted > 48 hours prior to delivery and who had had no contraindication to the use of ACs. A mother was considered to be 'unbooked' if she had not attended antenatal care at all. Statistical analysis, including descriptive statistics and Fisher's exact test, was undertaken on a personal computer using Statpak version 4.1 (Northwest Analytical, Portland, Oregon).

## Results

A total of 194 neonates < 1 500 g and/or at < 32 weeks' gestation was admitted to the neonatal unit during the study period. This included three sets of twins and one set of triplets, and corresponded to 189 pregnancies. There were 88 exclusions: 56 infants were referred from elsewhere, 18 were born before arrival and the records of 14 mothers were either missing or incomplete. The final analysis therefore involved 101 mothers. The mean maternal age was 25,4 years (SD 6,7), mean parity was 1,2 (SD 1,4) and mean gravidity 2,5 (SD 1,5). Sixty mothers were unbooked. Thirteen mothers had had a previous pregnancy loss, of whom 5 were unbooked. The mean estimated gestational age on presentation to the labour ward was 29,3 weeks (SD 3). Thirty-two infants were delivered by caesarean section.

Tocolysis was attempted in 13 patients, and 20 received ACs. Thirty-two mothers presented in advanced labour and 22 others had an indication for immediate delivery (Table I). Forty-three per cent of unbooked mothers presented in advanced labour compared with 12,5% of booked mothers ( $P = 0,0007$ ). In 3 pregnancies where ACs were not administered, the obstetric management was appropriate for gestational age; 2 were managed as inevitable abortions and in 1 the fetus was mature and labour was induced. The duration of pregnancy was incorrectly estimated in 4 unbooked mothers in whom the pregnancy was managed as an inevitable abortion. Two mothers who presented in early labour refused hospital treatment and discharged themselves against the advice of the attending doctor and thus did not receive steroids. Therefore, there were only 18 missed opportunities for the use of ACs. Of the 20 mothers who received ACs, 9 were admitted with pregnancy-induced hypertension (PIH), 7 with preterm labour without rupture of membranes (ROM), 2 with antepartum haemorrhage (APH) and 2 with preterm premature rupture of membranes (PPROM). The 18 mothers considered missed opportunities included 5 with PIH, 8 with PPRM, 4 with APH and 1 with preterm labour without ROM. Tocolysis was attempted in 2 missed opportunities; however, they did not receive steroids.

**Table I. Reasons for failure to administer ACs**

Admitted in advanced labour	32
Inevitable abortion	2
Chorio-amnionitis necessitating urgent delivery	7
APH necessitating urgent delivery	5
Severe PIH necessitating urgent delivery	6
Caesarean section for fetal distress	4
Missed opportunity for steroids	18
Misassessed gestational age (managed as inevitable abortion)	4
Refused hospital treatment	2
Induction of labour for ROM with fetus assessed as mature	1

APH = antepartum haemorrhage; PIH = pregnancy induced hypertension; ROM = rupture of membranes.

## Discussion

It is generally accepted that ACs significantly improve neonatal outcome and the cost and duration of neonatal care by reducing complications of preterm birth.<sup>1-6</sup> The use of ACs should therefore be considered as part of standard therapy in the management of preterm labour. It has been shown that the combination of ACs and surfactant is of cumulative benefit<sup>7,8</sup> in the management of preterm neonates. It must be remembered that the availability of surfactant has not eliminated the need to administer ACs to mothers presenting in preterm labour.

This review of our statistics shows that in our unit only 20% of mothers presenting with premature deliveries receive ACs; this would appear to be an unacceptably low rate. However, the major reason for failure to use ACs is the lack of an opportunity to administer them to the majority of mothers: 32% presented in advanced labour and 22% had obstetric complications necessitating urgent delivery. The majority of these mothers were unbooked. A further 4 unbooked mothers did not receive ACs because the pregnancies were managed as inevitable abortions because of incorrect estimation of gestational age, although the birth weight of all the infants was in excess of the obstetric estimate and all were viable. This latter experience highlights a problem of the unbooked mother in whom fetal viability is assessed by estimation of fetal weight, often a difficult task in the presence of oligohydramnios and/or a mother in labour. The remaining 7% mothers did not receive ACs for reasons including refusal of hospital treatment, known or estimated gestational age below 26 weeks (these infants were born alive and admitted to the neonatal unit for a brief period before death) and gestational age above 35 weeks (in a booked mother).

Despite the fact that in most mothers in our unit there is no opportunity to administer ACs, there is still room for improvement in obstetric management: ACs were administered to only 20 of 38 women in whom there was an opportunity. Eight of the 18 mothers who did not receive ACs had PPRM. While the use of ACs in this condition has been controversial, meta-analysis has shown significant improvement in lung maturity without any increase in neonatal sepsis.<sup>9</sup> The use of ACs together with antibiotics and tocolytic agents in PPRM results in improved neonatal outcome.<sup>10</sup> It was disturbing to note that 2 women in whom tocolysis was successful did not receive steroids. In such circumstances, the usual purpose of tocolysis is the provision of sufficient time in which to administer a course of ACs. Another possible reason for obstetricians' missing

opportunities to administer ACs is the apparent tendency to observe the patient for some time before considering steroids rather than giving ACs on admission as part of conservative therapy. In several cases, the mother went into labour unexpectedly and delivered before ACs could be administered.

In order to improve the situation obstetricians must be acutely aware of the availability and benefits of ACs and must ensure that no opportunity for their administration is missed. However, the major problem in our situation is one of women presenting in advanced labour or as obstetric emergencies. The majority of these women have received no antenatal care. It is therefore necessary to devote specific attention to the problem of the unbooked mother in an effort to improve the booking status of our population. One or two antenatal visits allow an accurate determination of gestational age, high-risk pregnancies to be identified and some general advice to be offered the mother in respect of problems such as ROM, APH and preterm contractions. Even if the mother is unbooked, early presentation in labour still affords an opportunity for intervention such as tocolysis and the administration of ACs. Therefore, reasons for mothers presenting late and/or failing to attend antenatal clinics should be identified and addressed. These may include inability to afford the cost of care in terms of both money and time off work, and inadequate transport facilities. A system of local community clinics, which are open after regular working hours and which have an efficient referral system to a tertiary care unit, would go a long way to solving these problems. One possible explanation for unbooked mothers arriving in advanced preterm labour is that an illegal termination has been procured at a relatively advanced gestational age. This aspect is very difficult to evaluate objectively as mothers will not readily admit to such interference.

Although previous studies have commented on the infrequent use of ACs in South Africa (V. A. Davies — unpublished data), this is the first to consider the issue in terms of missed opportunities. While there are perhaps fewer missed opportunities than expected, we nevertheless wish to make the point that the use of a cost-effective preventive measure such as ACs should not be neglected where health care is strongly influenced by limited financial resources.

## REFERENCES

1. Crowley P. Promoting pulmonary maturity. In: *Effective Care in Pregnancy and Childbirth*. Vol 1. 746-762. Chalmers I, Murrery E, Keirse MJNC, eds. Oxford: Oxford University Press, 1989.
2. Collaborative Group on Antenatal Steroid Administration. Effect of antenatal dexamethasone administration on the prevention of respiratory distress syndrome. *Am J Obstet Gynecol* 1981; **141**: 276-285.
3. Van Marter LJ, Leviton A, Kuban KCK, Pagano M, Allred EN. Maternal glucocorticoid therapy and reduced risk of bronchopulmonary dysplasia. *Pediatrics* 1990; **86**: 331-336.
4. Leviton A, Kuban KC, Pagano M, Allred EN, Van Marter LJ. Antenatal corticosteroids appear to reduce the risk of postnatal germinal matrix haemorrhage in intubated low birth weight newborns. *Pediatrics* 1993; **91**: 1083-1088.
5. Clyman RI, Ballard PL, Sniderman S, et al. Prenatal administration of betamethasone for prevention of patent ductus arteriosus. *J Pediatr* 1981; **98**: 123-125.
6. Mugford M, Piercy J, Chalmers I. Cost implications of different approaches to the prevention of respiratory distress syndrome. *Arch Dis Child* 1991; **66**: 757-764.
7. Farrell EE, Silver RK, Kimberlin RN, Wolf ES, Dusik JM. Impact of antenatal dexamethasone administration on respiratory distress syndrome in surfactant treated infants. *Am J Obstet Gynecol* 1989; **161**: 628-633.
8. Smith J, Kirsten GF, Pieter CH, Steyn W, Odendaal HJ. The effect of prenatal betamethasone administration on respiratory distress syndrome in surfactant treated infants. Proceedings of the 12th Conference on Priorities in Perinatology, Department of Paediatrics, University of the Witwatersrand, March 1993.
9. Keirse MJNC, Ohlsson A, Treffers PE, Kanhai HHH. Pre labour rupture of the membranes preterm. In: *Effective Care in Pregnancy and Childbirth*. Chalmers I, Murrery E, Keirse MJNC, eds. Oxford: Oxford University Press, 1989: 676-680.
10. Morales WJ, Angel JF, O'Brien WF, Knuppel RA. Use of ampicillin and corticosteroids in premature rupture of membranes: A randomised study. *Obstet Gynecol* 1989; **73**: 721-726.