Comparison of intravenous oxytocin and prostaglandin E₂ for accelerating labour

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Summary

In a prospective study of 52 consecutive women who required acceleration of labour intravenous prostaglandin E₂ (PGE₂) was used as the oxytocic agent. These mothers were matched for age, parity, height, gestational age, initial cervical dilatation, and station and position of the fetal head with 52 women whose labours were accelerated with oxytocin; both drugs were equally effective. Acceleration to delivery intervals, second-stage durations, the number of assisted deliveries, and Apgar scores were similar regardless of the oxytocic used. Although PGE₂ compares well with oxytocin, it offers no further advantages and is more expensive and less well tried than oxytocin.

Introduction

The active management of labour has become standard obstetric practice. The benefits offered to the mother and fetus have been shown in several studies.¹⁻³ The use of intravenous oxytocin to accelerate labour when progress is unsatisfactory is an important aspect of this policy. The value of intravenous prostaglandin E₂ (PGE₂) for accelerating slow labour has not been clearly defined, however; there have been two contradictory reports on this subject.^{3,4}

Our aim was to compare the relative efficacy of intravenous PGE₂ and oxytocin (Syntocinon) for accelerating labour and to establish whether there are any special circumstances when the use of intravenous PGE₂ would be preferable.

Patients and methods

In a prospective study 52 consecutive patients who required acceleration of labour were given intravenous PGE₂. These patients were then compared with a matched sample of patients whose labours were accelerated with intravenous oxytocin. The latter were selected from a series of patients whose labour required acceleration immediately after the completion of the intravenous PGE₂ study.

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TABLE 1—Maternal characteristics of patients who received PGE₂: patients who received oxytocin were matched with first group for each variable

	Age (years)			Parity			Height (cm)			Gestational age (weeks)		Cervical dilatation (cm)		Station of fetal head (cm)		
	<20	21-30	31-40	0	1-3	4-5	<145	146-153	≥154	37-39	40-42	≤5	>5	>-3	-2 to -1	0
No of women	20	28	4	28	21	3	3	11	38	19	33	20	32	5	34	13

All patients had a gestational age of at least 37 weeks and a cephalic presentation. They were matched for maternal age, height, parity, gestational age, cervical dilatation, and station and position of the presenting part immediately before augmentation of labour (table I).

The mean birthweight ($\pm$ SD) was 3310 $\pm$ 406 g after PGE₂ accelerated labour and 3250 $\pm$ 582 g after oxytocin (t test; $P>0.1$).

All labours were monitored on a partogram. Labour was accelerated if the patient's progress reached a point two hours or more to the right on the partogram.⁵ No patient's progress exceeded a point four hours to the right of the partogram. The progress of labour was intensively monitored by regular vaginal examination (two to four-hourly); fetal heart rate and uterine activity were recorded continuously in all patients using a Sonicaid FM 2 monitor. In both groups the membranes were ruptured before intravenous drug administration.

Both drugs were administered by IVAC constant infusion pumps. Records were kept of the drip rates, acceleration to delivery intervals, the length of the second stage, and Apgar scores at one and five minutes. Infusion rates were titrated against uterine response. The PGE₂ infusion rate ranged from 0.20 to 2.5 μ g/min; for oxytocin the infusion rate was 2-64 mU/min. Conventional parenteral analgesia was administered as required, and no patient was given epidural analgesia.

Student's t test was applied to assess the significance of differences between the two groups.

Results

In both primigravidae and multiparae the mean acceleration to delivery intervals when labour was accelerated with intravenous PGE₂ were not significantly different from those after the use of intravenous oxytocin (table II); the second stage durations were also similar ($P>0.1$ in both cases). When the cervical dilatation at acceleration was 5 cm or less the mean acceleration to delivery intervals were similar ($P>0.05$). This also applied when the initial cervical dilatation was greater than 5 cm (table III).

TABLE II—Mean acceleration to delivery intervals and second stage durations ($\pm$ SD)

	Primigravidae		Multiparae	
	Acceleration-delivery interval (hours)	2nd-stage duration (minutes)	Acceleration-delivery interval (hours)	2nd-stage duration (minutes)
Oxytocin group	6.13 $\pm$ 3.76	31.8 $\pm$ 18.7	5.15 $\pm$ 3.81	14.4 $\pm$ 6.13
PGE ₂ group	6.00 $\pm$ 2.15	36.3 $\pm$ 32.5	5.38 $\pm$ 2.24	15.8 $\pm$ 8.3

TABLE III—Mean acceleration to delivery intervals ($\pm$ SD) related to initial cervical dilatation in primigravidae and multiparae

Dilatation:	≤5 cm		>5 cm	
	Primigravidae	Multiparae	Primigravidae	Multiparae
Oxytocin group	6.63 $\pm$ 4.79	7.56 $\pm$ 5.76	5.47 $\pm$ 1.59	3.94 $\pm$ 1.45
PGE ₂ group	6.65 $\pm$ 2.09	5.52 $\pm$ 1.49	5.52 $\pm$ 2.60	5.30 $\pm$ 2.58

TABLE IV—Comparison of other relevant features of labour and delivery. Results are numbers of mothers or babies

	PGE ₂ group	Oxytocin group
<i>Maternal</i>		
Uterine hypertonus		
Phlebitis	2	
Diarrhoea		
Ketosis	2	1
Caesarean section	2	1
Forceps delivery	4	5
Post-partum haemorrhage	2	3
<i>Fetal/neonatal</i>		
Fetal distress:		
Tachycardia		1
Bradycardia	1	1
Type I dips on fetal heart monitor	3	
Type II dips on fetal heart monitor	2	3
Abnormal fetal pH		
Apgar score at 1 min (5 min):		
5-8	15 (3)	18 (5)
>8	37 (49)	34 (47)
Neonatal jaundice*	8	9

*Serum bilirubin >171 µmol/l (10 mg/100 ml).

The incidence of side effects, fetal heart irregularities, low Apgar scores, neonatal jaundice, and assisted deliveries was similar. Only two patients who received PGE₂ developed phlebitis. No patient in either group developed uterine hypertonus.

Discussion

Intravenous PGE₂ appears to be as effective as oxytocin in accelerating labour. Clegg *et al*³ reported a significantly shorter acceleration to delivery interval when intravenous PGE₂ was used to accelerate labour, but we found that both the acceleration

to delivery interval and second-stage duration were similar, irrespective of the oxytocic agent used. Cervical dilatation before acceleration of labour was irrelevant so far as the choice of oxytocic was concerned; both drugs were equally effective at different stages of cervical dilatation.

In contrast to the findings of an earlier study,⁴ oxytocin showed no advantage over PGE₂ in expediting delivery in primigravidae. The instrumental delivery rate was similar, regardless of the drug used. Likewise, in multiparae both drugs proved to be equally effective.

Intravenous PGE₂ carefully administered on a dose-response titration basis seems to cause few maternal side effects. Moreover, its use for accelerating labour does not cause an increased risk to the fetus compared with oxytocin. Nevertheless, PGE₂ offers no special advantages over oxytocin when used to accelerate labour. Oxytocin is cheaper, well tried, and has proved to be as free of side effects. Consequently, we recommend its continued use for stimulating inert labour.

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Bran tablets and diverticular disease

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Summary

Three treatments for patients with symptomatic diverticular disease were compared in a crossover trial. Neither a high-roughage diet (HRD) nor Normacol plus an antispasmodic were as effective as bran tablets, which produced a significant increase in daily stool weight and a decrease in the intestinal transit time. An abnormal rapid electrical rhythm in colonic smooth muscle was found initially in 80% of the patients, but the incidence was reduced by each treatment after one month; it was present in only 40% of patients after treatment with bran tablets. Only bran significantly reduced the high percentage motility to within normal limits.

Bran proved to be the most effective treatment, not only in improving the symptoms in patients with diverticular disease but also in returning to normal the abnormal pathophysiological changes. Bran tablets were both convenient and acceptable as well as effective.

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Introduction

Many workers have associated a lack of cereal fibre in the diet with the development of diverticular disease. The initial experimental work was performed in 1949 by Carlson and Hoelzel,¹ who found that rats fed on a low-residue diet developed diverticula while those fed on a high-residue diet were unaffected. Since then much epidemiological evidence has supported this hypothesis. It has been estimated on the basis of barium enema and necropsy studies²⁻³ that up to 20% of people over the age of 40, and 70% over the age of 70, in both the UK and USA have evidence of diverticular disease, whereas fewer than 12 cases have been observed in rural Africa in the last 20 years.⁴⁻⁶ The most important dietary difference in these societies seems to be a considerable reduction of fibre intake and an excess of refined carbohydrate in the Western diet.⁶

Clinical improvement in patients with diverticula fed high-residue diets is now well documented,⁷ but controversy still exists on the most effective form of bulk replacement.⁸⁻⁹ We have compared both symptomatic and objective improvement in patients with diverticular disease using three standard regimens: a high-roughage diet with bran supplements (HRD), a bulk laxative (Normacol plus an antispasmodic), and regular large quantities of bran (in the form of bran tablets). Each bran tablet contained 2 g of bran and nine tablets were prescribed each day in divided doses. Patients taking the high-roughage diet were told which foods were high in fibre content and given a