

4 types of Ad7 previously isolated from 164 wild-type isolates.<sup>14,21</sup> Virus from one of our patients (shown in figs 1 and 2 [lane 3]) represents a group of 7 isolates from patients infected by an Ad35-like virus which is a recombinant between Ad 35 DNA and the fibre region of Ad7 DNA. This recombination can be demonstrated by DNA restriction patterns which are the result of specific sequences widely dispersed in the genome. Because our 4 initial AIDS isolates were typed by haemagglutination inhibition as 2 distinct viruses (type 7 or 34/35), we propose that restriction endonuclease typing be used to measure the relationship between the adenoviruses derived from AIDS patients lest we lose sight of the basic similarities of most of these urine isolates.

Adenoviruses are much less common than herpesviruses in immunosuppressed hosts. Ad isolates from 15 immunocompromised patients showed a distribution of serotypes among group B (Ad7 and 11) and C (Ad1, 2, 4, 5 and 6); only 4 of these viruses were isolated from the urinary tract.<sup>22</sup> Reports based on small numbers of patients have suggested that type 34 and 35 infections may be more common in immunosuppressed hosts but this relation needs to be further defined.<sup>23,24</sup> Some of the 39 distinct adenovirus serotypes persist for long periods in tonsillar tissue.<sup>25</sup> However, if reactivation of latent virus is used to explain the high frequency of adenoviruses in our series, it is odd that in urine one basic genotype (Ad35) should be reactivated to the exclusion of all others.

At the very least this report suggests that adenoviruses should be added to the list of opportunistic agents that infect AIDS patients. However, attention should be paid to the limited genotypes of Ads expressed, since their relation to AIDS may be more direct than that of a secondary opportunistic invader.

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## A RANDOMISED TRIAL TO EVALUATE THE USE OF A BIRTH CHAIR FOR DELIVERY

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**Summary** A randomised study of 189 deliveries was conducted to compare performance in the conventional dorsal position with that in a birth chair. There was no significant difference in the length of the second stage of labour, the time spent bearing down, or the need for operative delivery. Overall blood-loss was greater among patients delivered in the chair but more of this group had either an intact perineum or only superficial damage. The condition of the neonates in the two delivery groups was similar.

### Introduction

In former times labour and delivery commonly took place with the woman upright or squatting.<sup>1,2</sup> Adoption of the dorsal position has been attributed to the French accoucheur, Mauriceau, in the 17th century and it is probable that this change was more for the convenience of medical supervision than to benefit mother or baby. Some obstetricians have advocated a return to a modified upright position for delivery.<sup>3,4</sup> The dorsal recumbent position in the second stage of labour may give rise to fetal acidosis.<sup>5</sup>

It may be more difficult for the midwife or doctor to control delivery while the mother is sitting or squatting. Delivery beds<sup>6</sup> and chairs<sup>7</sup> have been designed to overcome this difficulty. No controlled trials of their use have yet been reported. We have evaluated the use of a commercially

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produced delivery chair and have assessed the benefits and hazards of delivery in the sitting position.

### Patients and Methods

189 patients of mixed parity were studied. All had singleton pregnancies with a cephalic presentation at 37-42 weeks' gestation and no contraindication to vaginal delivery. Patients admitted both in spontaneous labour and for induction were included. Multigravidas were induced with amniotomy and oral prostaglandin E<sub>2</sub> tablets. Primigravidas were induced with vaginal or extra-amniotic prostaglandin E<sub>2</sub>. Intravenous oxytocin was used to augment labour when necessary but its use was restricted to the minimum dosage required to achieve satisfactory uterine activity. All labours were monitored throughout by continuous fetal heart rate recording with either conventional or radiotelemetry equipment. Analgesia, including epidural anaesthesia, was given as required. The first stage of labour was managed by the duty labour ward staff according to established labour ward practice.

Most patients had seen the delivery chair 'Birth E-Z' birthing chair (Century Manufacturing Co, Aurora, Nebraska) before labour when attending antenatal classes but all patients were able to see the chair again after admission and gave full consent before inclusion in the trial. Towards the end of the first stage of labour patients were randomly allocated into two groups by drawing a sealed envelope. Patients in group I were to be delivered in the chair and those in group II in a bed in the conventional recumbent position. At full dilatation of the cervix each patient had a vaginal examination to determine the position and station of the fetal head. She was then transferred to the delivery room. All spontaneous deliveries were carried out by senior midwifery sisters who had previously gained experience in delivering patients in the chair. During delivery the chair was maintained with the back 15 to 20 degrees from the vertical. Patients in group II were in a dorsal recumbent position but could be propped up to a maximum of 20 degrees from the horizontal. Full details of labour and delivery were recorded and the condition of the babies at birth was assessed by 1 and 5 minute Apgar scores and measurement of the umbilical artery blood pH. Statistical analysis was carried out by Student's *t* test for the differences between means and the  $\chi^2$  test to compare the distribution of variables between samples. Yates' correction was used where appropriate.

### Results

99 patients (40 primigravidas) were allocated to delivery in the chair (group I) and 90 patients (36 primigravidas) were allocated to delivery in bed (group II). There were no differences between the two groups in age, height, weight, parity, gestational age, and social class.

Among the primigravidas there were more patients in group I who had labour induced or required oxytocin augmentation. The first stage of labour was also shorter in these patients. None of these differences was statistically significant. At full dilatation the station of the presenting part was higher among multigravidas than among primigravidas within each group. There was, however, no difference between the two study groups. Details of the first stage of labour are given in table I.

5 patients in group I were excluded from the trial. 2 multigravidas had precipitate deliveries before they could be moved to a delivery room and 1 changed her mind about delivering in the chair at the time of her transfer. 2 primigravidas were thought by the duty obstetric registrar to be unsuitable for delivery in the chair. One had had late sedation and the other was grossly obese with a profound motor nerve block from an epidural anaesthetic. Both these patients eventually required forceps delivery for delay in the second stage of labour.

TABLE I—DETAILS OF FIRST STAGE OF LABOUR

	Primigravidas		Multigravidas	
	Chair (40)	Bed (36)	Chair (59)	Bed (54)
Induced labours (%)	17 (42)	10 (27)	28 (47)	33 (61)
Labours requiring oxytocin augmentation	12	8	2	5
Mean duration of first stage (h) ( $\pm$ SD)	7.4 ( $\pm$ 2.9)	8.8 ( $\pm$ 3.5)	4.7 ( $\pm$ 2.7)	4.9 ( $\pm$ 3.2)
Analgesia:				
None	2	2	26	22
Epidural	23	18	6	7
Pethidine	15	16	27	25
Mean dose of pethidine (mg) ( $\pm$ SD)	111 ( $\pm$ 36)	106 ( $\pm$ 41)	70 ( $\pm$ 37)	84 ( $\pm$ 40)
Position of fetal head at full dilatation:				
Occipito-anterior	28	28	53	48
Occipito-lateral	7	4	5	5
Occipito-posterior	5	4	1	1
Station of vertex relative to ischial spines:				
At or above 0	7	10	24	12
0+1 cm	18	11	13	20
0+2 cm	13	9	14	17
At or below 0+3 cm	2	4	8	5
		(2 not recorded)		

Those patients who delivered in the chair had a shorter mean duration of the second stage of labour but this was not statistically significant (table II). Two primigravidas, one from each group, were delivered by caesarean section for cephalopelvic disproportion. All other patients achieved a vaginal delivery and there was no difference between the groups in the overall proportion of forceps deliveries. However, among primigravidas with epidural anaesthesia the frequency of forceps delivery for delay in the second stage in labour was 6 of 23 in the chair as against 10 of 18 in bed. This suggests that the chair may help to overcome the difficulty of delivering spontaneously while under epidural block.

Mean birthweight and condition of the baby at birth were similar in the two groups. Multigravidas in group I had a significantly higher mean blood loss at delivery than those in

TABLE II—DETAILS OF SECOND STAGE OF LABOUR AND DELIVERY

	Primigravidas		Multigravidas	
	Chair (38)	Bed (36)	Chair (56)	Bed (54)
Mean duration of second stage (min) ( $\pm$ SD)	81 ( $\pm$ 65)	94 ( $\pm$ 79)	18 ( $\pm$ 19)	26 ( $\pm$ 24)
Mean duration of active pushing (min) ( $\pm$ SD)	42 ( $\pm$ 27)	49 ( $\pm$ 28)	17 ( $\pm$ 18)	21 ( $\pm$ 17)
Mode of delivery:				
Spontaneous vaginal delivery	28	24	55	53
Forceps delivery	9	11	1	1
Caesarean section	1	1	0	0
Mean blood-loss (ml) ( $\pm$ SD) (excluding caesarean)	305 ( $\pm$ 246)	268 ( $\pm$ 213)	288 ( $\pm$ 267)*	166 ( $\pm$ 152)*
Number with blood-loss >500 ml	4	2	8	2
Perineal damage:				
None	11†	2†	7	13
First-degree tear	9	2	26	23
Second-degree tear	5	5	9	7
Episiotomy	12†	26†	7	13

\* $p < 0.001$ , student's *t* test; † $p < 0.01$ ,  $\chi^2$ .

group II. There were significantly fewer episiotomies and more patients with an undamaged perineum among the primigravidas who delivered in the chair. These differences remained significant when multigravidas and primigravidas were analysed separately.

### Discussion

Atwood<sup>8</sup> and Dunn<sup>9</sup> have suggested that the position adopted for the second stage of labour is determined more by custom than by the process of parturition. They also point out that there is no "correct" birth position but that each has certain advantages and disadvantages. There are several theoretical advantages to the upright or squatting position. In this position the sagittal diameter of the pelvic outlet is increased, which may help to overcome minor degrees of cephalopelvic disproportion.<sup>10</sup> Gravity will aid the downward pressure of the expulsive efforts of uterine contractions and the abdominal musculature but this influence is probably of little importance. The pressure of the uterus on the vena cava will also be reduced with less likelihood of the fetal hypoxia that can occur in the dorsal position.<sup>5</sup>

Some workers have suggested considerable practical advantages to a semi-upright position for delivery. Liu<sup>11</sup> has demonstrated that the duration of the second stage of labour may be reduced. The patients in her study were highly selected. Hugo<sup>12</sup> has claimed a reduction of forceps deliveries and episiotomies. Delivery in the sitting or squatting position, however, may make access to the perineum difficult. Also if obstetric intervention is required the patient may need to be transferred to a bed. The fully adjustable delivery chair which we used overcame both these difficulties since there is clear access to the perineum and it could be easily tilted backwards until the patient was in a modified lithotomy position. The use of the chair also enabled standardisation of the posture adopted.

In this trial the upright delivery position was not shown to reduce the duration of the second stage of labour, although the length of labour in both the study groups was much longer than those noted by Liu.<sup>11</sup> This may be related to the number of patients in the study who had epidural anaesthesia. In addition, no difference was found in the incidence of forceps delivery. There did, however, appear to be some small benefit to those patients who had an epidural anaesthetic. Of the 23 primigravidas who had an epidural and delivered vaginally in the chair there were 6 forceps deliveries for delayed second stage. This compared with 10 instrumental deliveries among the 18 patients who delivered in bed with an epidural. This difference was not significant with the small numbers involved but it may be that the upright position does help patients with reduced perineal sensation and muscle tone to achieve a spontaneous delivery. The results of the study accord with the suggestion of Hugo<sup>12</sup> that the upright position reduced the number of episiotomies performed. In an attempt to standardise techniques all our spontaneous deliveries were carried out by a small number of senior midwifery sisters. They reported no noticeable difference in the way in which the fetal head distended the perineum between the groups of patients delivering in the two positions. Nevertheless, important perineal damage (episiotomy or second-degree tear) occurred in 20 out of the 24 primigravid patients who delivered spontaneously in bed

compared with only 8 of those 28 who delivered in the birth chair. There is no obvious explanation for this difference, but if it is confirmed on larger experience it may prove to be a considerable advantage of delivery in the chair.

The only disadvantage of delivering in the upright position appeared to be the increased frequency of postpartum haemorrhage and the higher mean blood-loss at delivery. We consider that three factors may contribute to this. Firstly, several multigravidas had very rapid deliveries in the chair and these tended to be associated with haemorrhage from an atonic uterus. Similar rapid deliveries in the recumbent position did not appear to have such an association. Secondly, episiotomies and perineal lacerations appeared to bleed more freely when patients were delivered in the chair. This may have been because the perineum was then the most dependent part of the maternal trunk, with a consequent increase in the venous pressure in that area. Thirdly, deliveries in the chair were conducted with a minimum number of sterile drapes and all blood and liquor drained into a receptacle below the chair. In contrast, when delivery took place on a bed some of the blood seeped into the sheets and sterile towels so that the blood-loss may have been underestimated. This factor was probably the least important of the three and could certainly not account for all the differences observed.

The study demonstrated no other deleterious effects to mother or fetus from delivery in the birth chair. Midwives who took part in the study found their working position when delivering patients in the chair quite satisfactory and most patients were comfortable sitting in the chair. Many commented that the position reduced their backache, a finding which has also been reported by Hawkeland.<sup>7</sup>

The dorsal position for delivery has no established benefit. It may even have some disadvantages. Some women, given the choice, may instinctively adopt the squatting position but this may in certain circumstances be harmful to mother and baby. A birthing chair which allows a woman a more "physiological" position but also admits easy access to the fetus and perineum for obstetric intervention, if needed, may be an acceptable alternative. In this study we demonstrated no major advantage of delivering in the upright position.

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