

Congenital dislocation of the hip: Why is the left hip affected more than the right?

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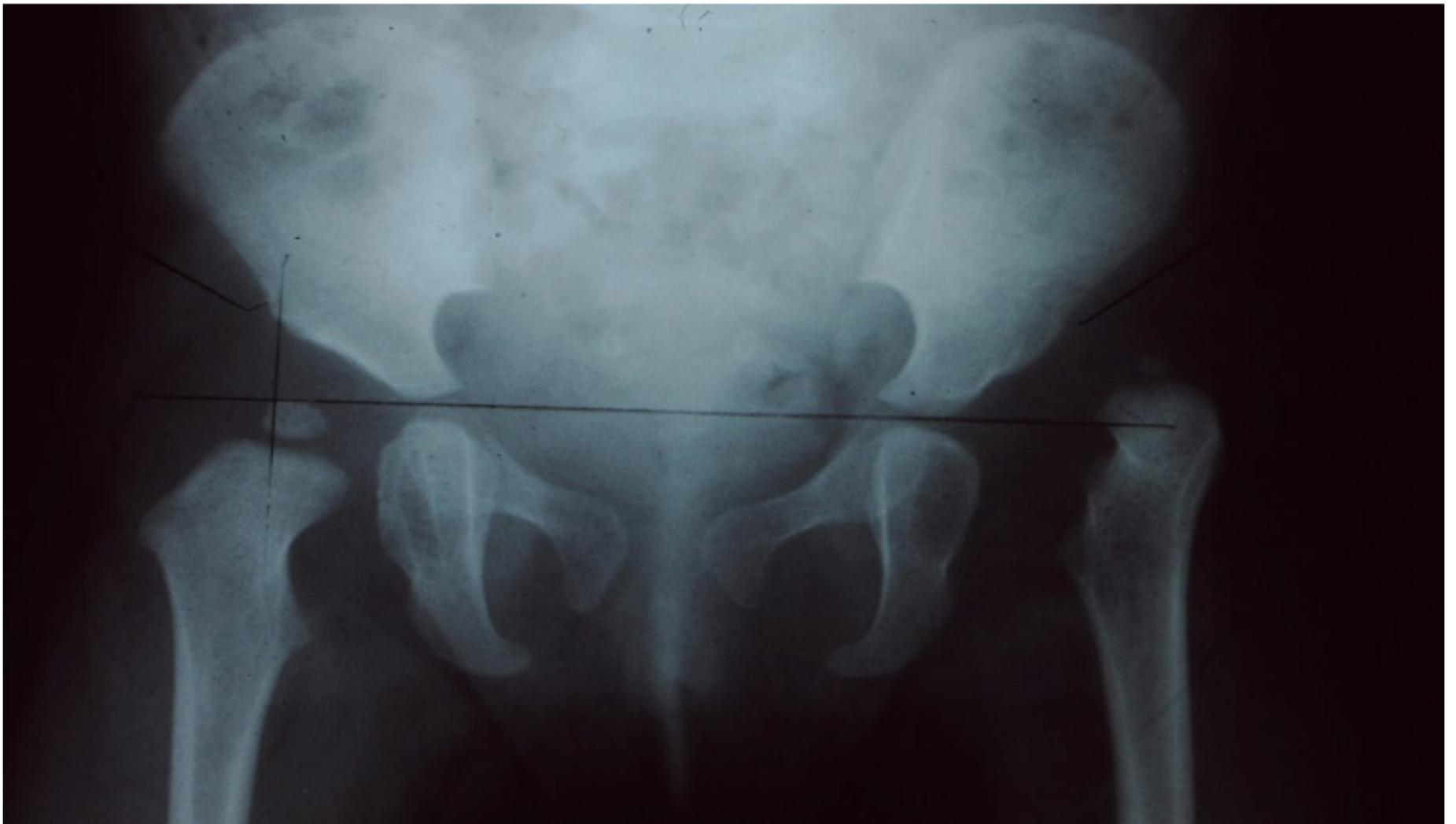


Fig 1 Xray pelvis of a girl at 18 months age showing left-sided congenital dislocation of the hip.

INTRODUCTION

By 1960 it was recognised that congenital dislocation of the hip (CDH) more often affected the left hip than the right (Fig 1) (1,2). This observation, however, remained unexplained. CDH was at the time generally considered to be due to multifactorial genetic factors. The theory that it might be due to mechanical forces acting in-utero, originally suggested by Hippocrates and more recently advanced by Browne(3), was in general either neglected or dismissed(4). During the 1960s and 1970s the author undertook three clinical, pathological, radiological and epidemiological studies on CDH. The conclusion reached was that CDH was a congenital postural deformity caused by sustained gentle pressure in-utero acting on the plastic and rapidly growing hip-joint during the later weeks of pregnancy(5-9). During these studies observations were made that provided an

explanation for the predominance of left-sided CDH. This communication brings together the relevant data from these studies and discusses the conclusions reached.

MATERIAL

The main studies from which data will be drawn are summarised below. More detail may be found in the referenced sources.

Study 1(5-7)

The medical records of 244 infants born in Birmingham between 1950 and 1962 and diagnosed in orthopaedic clinics as having CDH (average age at diagnosis: 19 months) were reviewed and the laterality of the condition noted.

In 103 cases it was also possible to trace their mother's maternity records and to determine the presentation of the fetus at the time of delivery.

Study 2(5-7)

A total of 6,756 infants consecutively born at either the Birmingham Maternity Hospital (1960-61) or in the South Warwickshire Hospitals (1962-63) were screened at birth for CDH and other postural deformities. Epidemiological studies were undertaken on the maternal and perinatal factors associated with normally formed infants, those with congenital malformations, and those with CDH (n=58) and other postural deformities.

Study 3(8)

All 23,002 infants born in the University of Bristol Department of Obstetrics 1970-79 were screened for CDH at birth. 445 infants (1.9%) were noted to have unstable hips. Epidemiological studies were undertaken on the maternal and perinatal factors associated with normally formed infants, malformed infants, and those with CDH and other postural deformities.

Congenital dislocation of the hip: Why is the left hip affected more than the right? (continued)

RESULTS

The laterality of CDH

In Study 1(5-7) both hips were dislocated in 26% of cases, the left hip alone in 59% and the right hip alone in 15%. Thus the left hip was affected twice as often as the right (67% v 33%). In Study 3(8) the difference was slightly greater (70% v 30%).

Among infants diagnosed at birth, the tendency was noted in both studies for the right hip to be less severely affected* than the left and to be more likely to stabilise during the first week of life. This observation received support from the fact that the preponderance of left-sided CDH was greater among those diagnosed after the neonatal period than among those diagnosed at birth (Fig 2) (5-7).

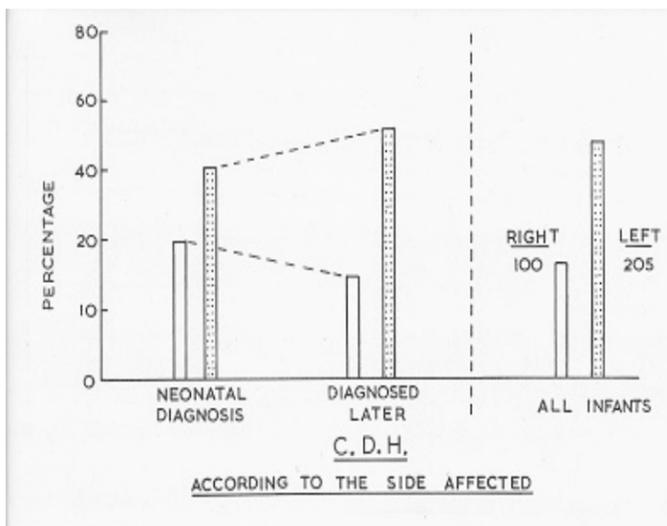


Fig 2 Laterality of CDH in relation to age at diagnosis(5-7).

Fetal presentation at delivery

In Study 2 the fetal presentation at the time of delivery (all births) was vertex in 95% and breech in 5%. This figure includes infants delivered by Caesarean section. In Study 3 the figures for all births were vertex: 96% and breech: 4%. In 1963 a radiographic study(5) was made of fetal presentation in late pregnancy using sets of three X-rays (anterior/posterior, lateral and oblique views) taken from the files of the late Dr. Blair Hartley of Manchester. All the late pregnancy fetuses studied had subsequently been born alive and found to be free of congenital malformation. The first part of this study involved

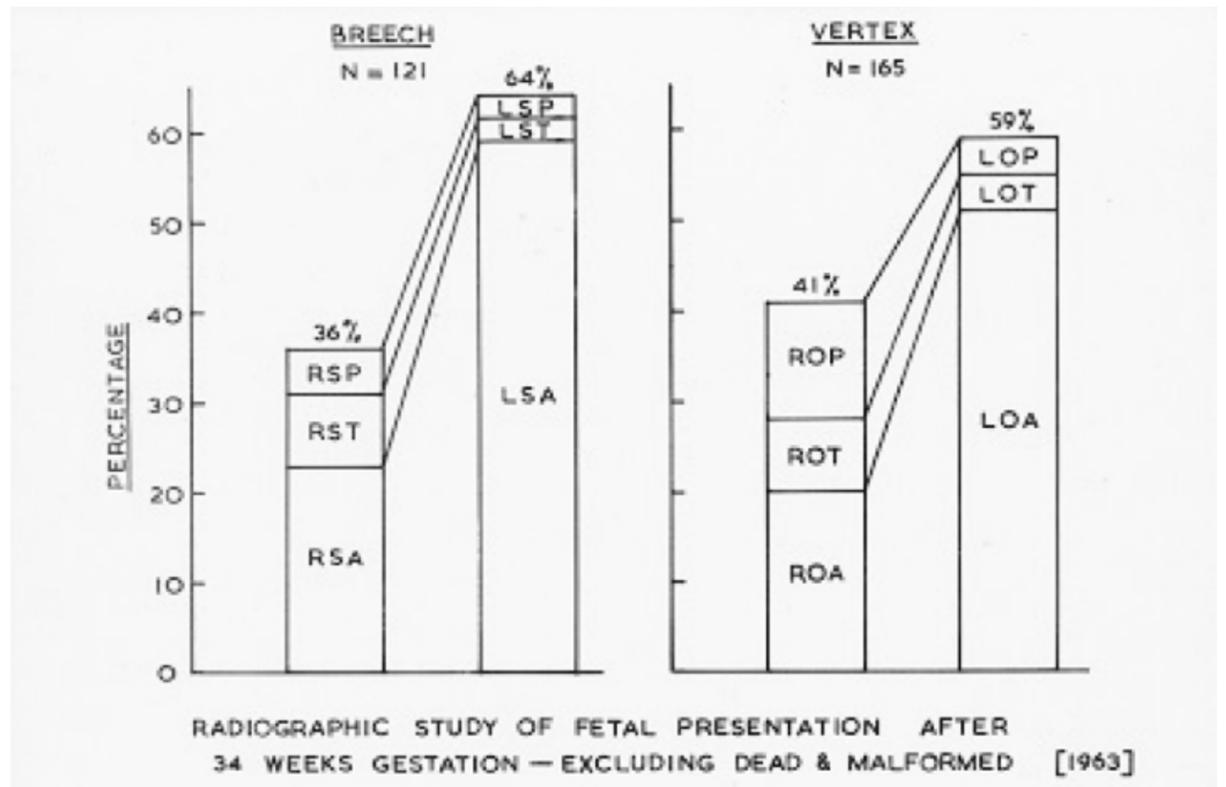


Fig 3 Radiographic study of fetal presentation (breech or vertex) in late pregnancy (L = left; R = right; S = sacral; O = occipital; A = anterior; T = transverse; P = posterior).

165 cases of vertex presentation and the second part 121 cases of breech presentation. The result of these studies is shown in Fig 3. Whether presenting by the vertex or the breech, the fetus was found to lie with his/her back on the left side of the uterus more often than on the right (vertex: 59% v 42%; breech: 64% v 36%). The difference was even greater (approximately x 2) if the anterior vertex and breech positions were considered on their own.

CDH and fetal presentation

When infants diagnosed as having CDH in Study 1 were considered, analysis revealed a relationship between the fetal presentation and the laterality of the dislocation. For example, infants presenting by the vertex with their back towards the left side of their mother's uterus (Fig 4) were much more likely to suffer from left-sided CDH than right (87% v 13%). This difference was reversed when the infant presented by the breech (29% v 71%) (Fisher's exact significance test, p=0.0066.) In each instance it was, of course, the hip of the fetal leg lying posteriorly in the uterus that was more likely to be dislocated.

DISCUSSION

In the past it has been suggested that the preponderance of left-sided CDH

might be related to the preference that mothers showed in holding and carrying their infants on the left hip(10), thereby leading to greater adduction of the baby's left hip. However this explanation, while it might be tenable for late diagnosed CDH, fails to explain the excess of left-sided CDH in infants screened at birth (e.g. Study 3). Another suggestion that has been advanced is that during Ortolani/Barlow screening for CDH at birth the baby's right hip will be manipulated by the examiner's left hand and the left hip by



Fig 4 Fetus in-utero. Left occipito-anterior presentation at 38 weeks gestation. Evidence of oligohydramnios. Left-sided CDH detected following delivery.

* Footnote: The clinical prediction of the status of the neonatal hip-joint (normal, subluxatable, dislocated) was confirmed correctly at necropsy in 99% of cases(5,9).

Congenital dislocation of the hip: Why is the left hip affected more than the right? (continued)

his right hand. In which case, as the majority of people are right handed, instability of the left hip might be more likely to be detected. This hypothesis also fails in that the preponderance of left-sided CDH was reported in many studies before screening at birth had been introduced^(1,2) (e.g. Study 1). A much more probable explanation lies in the observations reported above. It has been shown that the hip of the fetal leg lying at the back of the mother's uterus is significantly more likely to become dislocated than the one lying anteriorly, whether the presentation is by the vertex or the breech. The vulnerability of the hip at birth to dislocation is intimately related to its degree of abduction, being increasingly unstable with increasing adduction, as revealed in the Ortolani/Barlow manoeuvre. This fact was also clearly demonstrated visually during the postmortem studies of CDH^(5,9). What is true at birth must also apply to the fetus in pregnancy.

In late pregnancy the uterus distends the mother's abdominal cavity. Her abdominal muscles tend to press the uterus backwards against her spine which protrudes forwards especially in the lumbo-sacral area (Fig 5). This forward projection of the spine will tend to lead to adduction of the hip of the leg lying at the back of the uterus, while at the same time tending to abduct the leg and hip lying anteriorly. This is particularly likely to be the case when the fetus is lying in the occipital or sacral anterior positions. It is also likely to be influenced by the tension of the mother's anterior abdominal wall, which will be greater in first rather than subsequent pregnancies when the abdominal musculature has already been stretched. The fact that CDH is twice as common in first as in later pregnancies was also confirmed in these studies⁽⁵⁻⁸⁾ as previously reported⁽²⁾.

CONCLUSION

CDH occurs approximately twice as often on the left side as on the right. The fetus lies twice as often with his/her back on the left side of the uterus than the right. The fetal leg lying at the back of the uterus is more likely to be adducted at the hip joint than that lying anteriorly because of the prominence of the mother's spine. The more adducted the hip the more vulnerable it is to a dislocating pressure which, of course, is why unstable hips at birth are splinted in abduction. The degree of fetal hip adduction of the posterior leg caused by the mother's spinal prominence will be increased in the presence of oligohydramnios or when the maternal abdominal wall is unstretched as in first pregnancies (Fig 5). In both circumstances, the incidence of CDH is significantly increased⁽⁶⁾.

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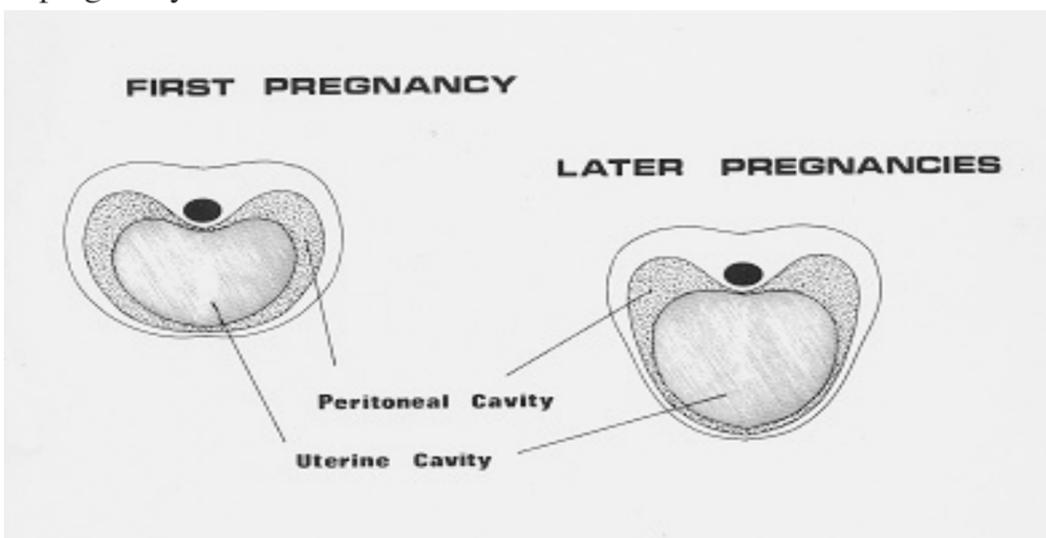


Figure 5a

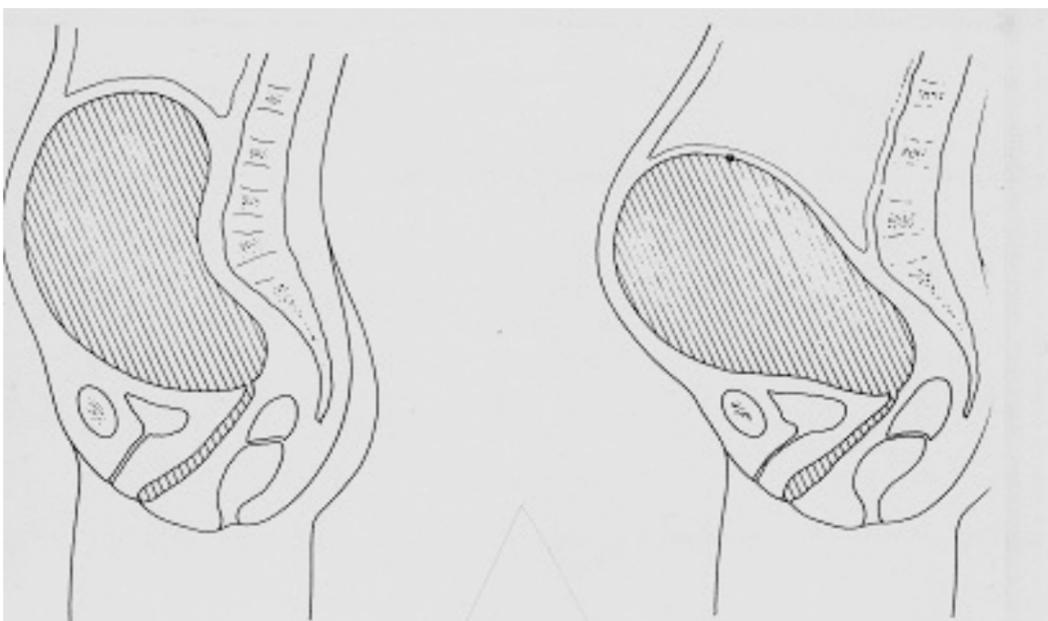


Figure 5b

Fig 5 Diagrammatic (a) transverse and (b) sagittal sections of the abdomen of a primigravida (left), and multi-gravida (right) woman to illustrate the influence of the abdominal wall on the shape of the uterine cavity during the later weeks of pregnancy.