

## Brief Clinical Report

# Prenatal Diagnosis of Congenital Diaphragmatic Hernia Not Amenable to Prenatal or Neonatal Repair: Brachmann-de Lange Syndrome

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Brachmann-de Lange syndrome (BDLS) is a variable multiple congenital anomaly syndrome that occasionally includes congenital diaphragmatic hernia (CDH). CDH per se is commonly diagnosed antenatally and has been corrected with increasing success in utero and by neonatal repair with extracorporeal membrane oxygenation (ECMO). In utero repair requires normal karyotype as well as the absence of other lethal anomalies. Postnatal repair in combination with ECMO has resulted in improved neonatal outcome and has been recommended in all cases not having in utero repair. We describe a fetus diagnosed with a diaphragmatic hernia at 18 weeks of gestation in a woman whose only other pregnancy has been a 16 week abortus diagnosed with Fryns syndrome (FS). FS is a lethal, variable congenital anomaly syndrome that includes CDH, which is thought to contribute to the lethality of the syndrome. In utero repair was considered, but rejected because of the position of the liver and suspected FS. The patient elected to carry the pregnancy to term. Postnatal repair with ECMO was considered; however, the infant died at several hours of age because of severe pulmonary hypoplasia, being considered ineligible for ECMO. The diagnosis of BDLS was made at autopsy and suggests that the first case may, in fact, have been BDLS. In spite of recent success in the repair of CDH both in et ex utero, CDH in association with BDLS is likely lethal, and women with fetuses diag-

nosed antenatally with CDH and BDLS should be counseled as such. © 1993 Wiley-Liss, Inc.

**KEY WORDS:** Brachmann-de Lange syndrome, prenatal diagnosis, congenital diaphragmatic hernia, fetal surgery

## INTRODUCTION

Congenital diaphragmatic hernia (CDH) has a mortality rate of 80%. [Heeiaon and Delorimier, 1980]. Increased prenatal diagnosis with planned immediate repair has not significantly reduced the mortality rate [Evans et al., 1989] and has led to successful attempts at in utero repair, preventing pulmonary hypoplasia [Harrison et al., 1990]. Increasing success has also been reported with immediate repair in conjunction with extracorporeal membrane oxygenation (ECMO) [Connors et al., 1990; Newman et al., 1990]. According to accepted protocol, in utero repair requires normal karyotype as well as the absence of other lethal anomalies, which are present in 16% of congenital diaphragmatic hernia [Adzick et al., 1985]. Congenital diaphragmatic hernia has been associated with several syndromes including Brachmann-de Lange syndrome (BDLS) and Fryns syndrome (FS), both multiple congenital anomaly/mental retardation (MCA/MR) syndromes [Fryns, 1987; Fryns et al., 1979; Aymé et al., 1989; Opitz, 1985].

We report on a case of CDH with other anomalies diagnosed prenatally at 18 weeks gestation in a woman who had a previous 16 week abortus diagnosed as FS. Although the fetus of the current pregnancy had a normal karyotype and no other lethal anomalies by detailed ultrasound scan, in utero repair was rejected because of the position of the liver and the suspected FS.

## CLINICAL REPORT

A 24-year-old, gravida 4, para 0, abortus 2 woman, with a history of FS diagnosed in a female abortus at 16 weeks gestation, presented for genetic evaluation at 18

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weeks gestation. Detailed ultrasound demonstrated left diaphragmatic hernia with no other apparent lethal anomalies including central nervous system and heart. Minor anomalies, including skeletal abnormalities of the wrists, were noted. Genetic amniocentesis demonstrated a 46,XY normal male karyotype. In view of the couple's desire for all attempts to help, consideration was given for in utero repair of the diaphragmatic hernia. However, the position of the fetal liver in the thoracic cavity precluded such action as it would have for any fetus with only a CDH.

Despite the bleak prognosis, the patient elected to continue the pregnancy to term. Pediatric surgery consultation recommended neonatal repair followed by ventilatory support with ECMO. Repeat ultrasound at 28 weeks gestation demonstrated intrauterine growth retardation. At 39 weeks gestation, a male infant was delivered via primary low transverse cesarean section performed for a footling breech presentation, in spite of counseling against operative delivery.

The infant had Apgar scores of 4 and 5; cord arterial pH was 7.25. He was immediately intubated and required mechanical ventilation and oxygenation in the intensive care nursery. He had a birthweight of 1,960 g (< 10th centile), length of 40.5 cm (< 10th centile), and head circumference of 31.5 cm (< 10th centile), as well as generalized hirsutism, prominent occiput, anteverted nares, thin lips, posteriorly angulated auricles, and small mandible. The palate was intact. The upper limbs were progressively shortened from axial girdle to digits; the right hand had one digit, and the left hand had 2 digits. The lower limbs were normal in appearance. The nails were hypoplastic in all limbs. Bilateral cryptorchidism was present. Chest film demonstrated large and small bowel in the left hemithorax consistent with the diagnosis of congenital diaphragmatic hernia. Skeletal survey of upper limbs demonstrated absent wrists, carpal bones and radii. The infant was diagnosed with BDLS. His condition rapidly deteriorated, and he died at 5 hours of age after being considered ineligible for ECMO because of the liver position. Autopsy findings included cloudy corneae, a 4 × 4 cm left diaphragmatic defect with liver, spleen, stomach, small bowel and part of large bowel occupying the thoracic cavity. The right lung weighed 7.7 g and left lung 4.0 g with an expected combined lung weight of 44 ± 13 g. Limb defects were as described above. There were no other lethal anomalies.

## DISCUSSION

BDLS is a MCA/MR syndrome that occasionally includes CDH. Although *in utero* repair of congenital diaphragmatic hernia has been successful, this fetus was considered ineligible because of liver position and the presumed FS. Although counseled regarding the bleak prognosis because of the FS, the patient continued the pregnancy with the slim hope of neonatal repair.

Although this infant was subsequently diagnosed as BDLS, the neonatal course was identical to that described for FS infants [Fryns et al., 1979]. In retrospect, the first child probably also had BDLS although records are unavailable for further evaluation. Despite enthusiasm for prenatal surgery for CDH, it is still appropriate to limit in utero surgery to finely chosen fetuses with no other problems [Jennings et al., 1992]. Antenatal consideration for postnatal repair in conjunction with ECMO should also be limited to similarly chosen fetuses with no other problems.

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