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CLINICAL ARTICLE

Efficacy and safety of cordocentesis for prenatal diagnosis

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Abstract

Objective: To assess the efficacy and safety of diagnostic cordocentesis. *Methods:* Between January 1991 and May 2004, 2010 cordocenteses were performed in the outpatient setting in 2010 women with singleton pregnancies. A fixed needle guide and a 22-gauge percutaneous needle were used and no more than 2 attempts were allowed at 1 visit. In most cases, the umbilical vein was the target vessel. The results of each procedure and pregnancy outcomes were recorded and analyzed. *Results:* The most frequent indication for cordocentesis was risk of severe thalassemia (59.0%), followed by a need for rapid karyotyping (30.0%). Most of the procedures (97%) were performed in the free cord loop and the remaining at the cord insertion. The overall success rate was 98.4%, with 80.0% of the successful procedures performed at the first needle insertion and the remaining 20% at the second insertion. Transient bleeding was observed at the puncture site in 19.8% of cases and transient fetal bradycardia in 4.9% of cases. The total fetal loss and cordocentesis-related loss rates within 2 weeks of cordocentesis were 2.7% and 1.0%, respectively, before 24 weeks of gestation and 1.9% and 0.8% after 24 weeks. The other obstetric complications were unremarkable. *Conclusions:* Cordocentesis is a simple, safe, and reliable procedure for prenatal diagnosis.

1. Introduction

Since cordocentesis, or percutaneous fetal blood sampling via the umbilical cord, was first described in 1983, it has been widely used for prenatal diagnosis and therapy. Cordocentesis can

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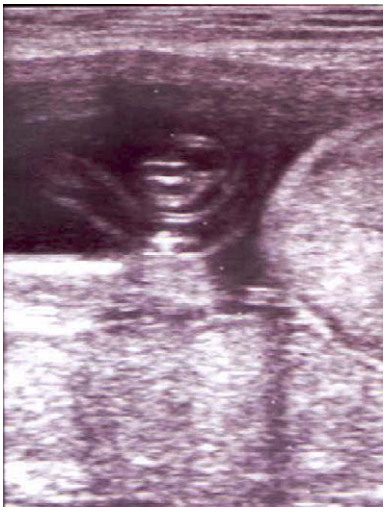

Figure 1 Sonographic view of cordocentesis showing the needle being inserted in a cord vessel (vein).

be performed during mid and late pregnancy, and it is preferred to amniocentesis for the diagnosis or evaluation of fetal conditions such as growth restriction, hydrops, infections, and abnormal hemoglobin in fetuses at genetic risk for hemoglobinopathies [1]. However, cordocentesis is also said to be associated with a higher fetal loss rate than amniocentesis. The present study reports on a 13-year experience of cordocentesis procedures performed at a single center.

2. Materials and methods

From January 1991 to May 2004, 2010 consecutive cordocenteses were performed at the outpatient clinic of Guangzhou Maternal and Neonatal Hospital after proper counseling was given and informed consent obtained. The cordocenteses were performed via a fixed needle guide under transabdominal ultrasonographic guidance using a 3.5-MHz convex transducer (Alo 630, Tokyo, Japan). A real-time ultrasonographic scanner permitted to locate the placenta and choose a puncture site that was easily visualized and accessible (Fig. 1). In aseptic conditions, a 22-gauge percutaneous needle (PTC needle; Hakko, Tokyo, Japan) was introduced through the needle guide into the umbilical vessel without local anesthesia. Depending on gestational age and indication for sampling, 0.5 to 2 mL of blood was aspirated from an umbilical vessel. No more than 2 attempts were allowed in 1 clinic visit. The procedure duration was not to be longer than 30 min, and was measured from the first needle introduction into the uterine cavity through the withdrawal of the needle with fetal blood obtained. After the needle was removed, the puncture site was observed for bleeding and the fetal heart rate was assessed. No cases of fetal paralysis were observed.

The pregnant women were kept under observation for 30 to 60 min in the waiting room before being discharged. No prophylactic antibiotics or tocolytic agents were given routinely. Anti-D immunoglobulin prophylaxis was given to Rh-negative women. The Kleihauer—Betke test was performed in all samples to confirm that the aspirated blood was of fetal origin. After completion of the procedure, the women whose pregnancies were to continue were followed up until delivery. Pregnancy outcomes, including preterm birth, intrauterine growth restriction, abruptio placentae, and chorioamnionitis were recorded. Statistical analyses were performed using the SPSS-PC software package (SPSS, Chicago, IL).

3. Results

3.1. Patient data

Only women with singleton pregnancies were recruited, and their mean $\pm$ S.D. age was 29.3 $\pm$ 5.1 years (range of 21—45 years). Among the 2010 diagnostic cordocenteses performed, 968 (53.2%) were carried out between 17 and 24 weeks of pregnancy, 805 (35.0%) between 25 and 27 weeks, and 237 (11.8%) between 28 and 34 weeks. The most common indication was fetal risk for thalassemia major, followed by a need for rapid fetal karyotyping, as shown in Table 1.

Table 1 Indications for cordocentesis

Indication	No. (%)
Fetal risk for severe thalassemia (n = 1186 [59.0%])	
Risk for Bart hemoglobin hydrops	679 (33.8)
Risk for β-thalassemia major	507 (25.2)
Karyotyping (n = 603 [30.0%])	
Advanced maternal age	259 (12.9)
Chromosome translocation carrier	201 (10.0)
Structural malformation on sonography	52 (2.6)
Polyhydramnios/oligohydrymnios	14 (0.7)
Both thalassemia and karyotyping (n = 111 [5.5%])	
Risk for Bart hemoglobin hydrops	70 (3.5)
Risk for β-thalassemia major	41 (2.0)
Others (fetal infection, prenatal HLA genotyping, blood chemistry)	110 (5.5)
Total	2010 (100)