

Nuchal Cord: An Unusual Manifestation

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Abstract: This case report describes an unusual manifestation of nuchal cord—significant fetal neck compression without compromised cord blood

flow. The physical signs and clinical outcome of this infant are reported. (*J Am Bd Fam Pract* 1988; 1:218-9.)

Nuchal cord is a common condition occurring in up to 25 percent of all deliveries.¹ It is frequently implicated in abnormalities of fetal heart rate but is actually an uncommon cause of fetal death.² A decrease in umbilical blood flow with resultant fetal distress and/or fetal heart rate abnormalities may occur as the cord tightens around the fetal neck during uterine contractions. A potentially significant, yet rarely discussed, corollary is fetal neck compression by the cord. The following case report describes a paradoxical presentation of nuchal cord, i.e., fetal neck compression without significant cord compression.

Case Report

A 19-year-old woman (gravida 5, para 1, spontaneous abortion 1, therapeutic abortion 2) was attended in the Moses H. Cone Memorial Hospital Family Practice Center throughout pregnancy without major complications. Two weeks before delivery she had a small amount of painless vaginal bleeding, and sonographic examination showed no evidence of placenta previa or abruption. Fetal heart tones and movements were normal. Two days before delivery she had the onset of irregular contractions and passed bloody mucus, but the fetal membranes were intact; a fetal heart tracing showed good variability without decelerations and good fetal activity. Two days later, she returned having regular uterine contractions every 3 to 4 minutes, and her cervix was dilated 5 cm with 90 percent effacement. Her admission

physical examination was normal and consistent with a 37–38 week gestation, confirmed by prior dates, ultrasound, and fundal height. Her labor lasted 4 hours and 58 minutes during which the fetal heart monitor showed good fetal activity with no decelerations and good variability throughout labor.

A 3,020 g male infant was born by vaginal delivery over a midline episiotomy after local anesthesia was obtained using 1 percent Xylocaine.TM The presentation was vertex and the position left occipitoanterior (LOA). The umbilical cord was looped tightly once around the neck and could not be loosened and removed, so it was clamped and cut. Bulb and DeLee suctions were employed with no evidence of meconium aspiration. Slightly delayed respiration and cry prompted administration of oxygen by mask. The infant was noted to have marked facial cyanosis despite the administration of oxygen and fully established regular, spontaneous respiration. The extremities were of good color as were all mucosal surfaces. Apgar scores were estimated at 6 for 1 minute and 8 at 5 minutes. With no peripheral cyanosis or respiratory distress and stable vital signs, arterial blood gas determination was not obtained.

On admission to the nursery, the baby's marked facial and head cyanosis persisted, but the skin color inferior to the neck was that of a normal black newborn. Numerous petechiae of the forehead and jaw were observed along with bilateral conjunctival hemorrhages, excessive periorbital edema, and a light blue, 2 cm circumferential ring around the neck. The anterior fontanelle was soft and flat, and the neck was supple. The chest was clear with normal respirations, the heart beat was regular without murmur, and the abdomen was normal. The infant moved all extremities spontaneously and no acrocyanosis was noted. The neurological exam was normal.

Three days after birth, the infant was feeding well and was neurologically normal. Laboratory

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The authors acknowledge support from the Moses H. Cone Hospital, the Greensboro Area Health Education Center, Greensboro, NC, and the Department of Family Medicine, School of Medicine, University of North Carolina, Chapel Hill.

values were normal, and there was no evidence of hyperbilirubinemia. The marked disparity of color between the patient's head and body was still present. The infant and mother were discharged to routine care at home. The infant showed no signs of cyanosis or petechiae, and head color was normal at a 3-week follow-up office visit. He was feeding well and progressing normally. At 4 months of age, his growth and development were appropriate, and there was no facial discoloration.

Discussion

The incongruity of skin color between this infant's head and body was no doubt a result of neck compression by the nuchal cord. A review of the literature yields only one other report of significant neck compression by a nuchal cord.³ In that case, the infant also had marked differential cyanosis, but the clinical course was more precarious. There were fetal heart rate abnormalities, and the infant was delivered by Caesarean section. Apgar scores were 4 and 8. Respiratory distress required hood oxygen, but the outcome, as with our infant, was favorable.

Compromised venous return from the head should lead to venous congestion, increased venous pressures, vascular sludging, and all the sequelae mentioned above (i.e., conjunctival hemorrhage, cyanosis, petechiae, and periorbital edema). More severe complications could occur, such as hydrocephalus and cerebral edema. These, however, were not seen in our infant.

One can propose three possible sequelae of nuchal cord. First, and most common, is a nuchal cord producing diminished cord blood flow with resultant fetal distress, heart rate decelerations, meconium staining, and low Apgar scores. This is common because the cord, particularly the less muscular umbilical vein, is easily compressed.⁴

The second, less common, consequence is the combination of reduced cord flow and fetal neck compression significant enough to cause facial edema, petechiae, and congestion. In this instance, a slightly tighter nuchal cord compresses the fetal neck veins after having already compressed the "weak" umbilical vein. The third, and least common, outcome of nuchal cord involves significant fetal neck compression without reduction of cord flow. This was seen in our infant who, despite obvious facial edema and cyanosis, had no evidence of fetal distress.

One would expect the degree of cord compression to be directly proportional to the degree of neck compression; however, the absence of abnormalities on the fetal heart monitor tracings is puzzling given the obvious severity of our infant's neck compression. The lack of fetal distress is confirmed, however, by the normal outcome for this infant.

Nuchal cord has also been shown to produce a lowered 1-minute Apgar score, a tight cord produces a slightly lower score than a loose one. This effect, however, disappears by 5 minutes. Our infant had a low 1-minute Apgar score, too, but the severe discoloration, which was a result of venous congestion rather than systemic hypoxia, was responsible for the lower score.

References

1. Danforth DN. *Obstetrics and gynecology*. 4th ed. Philadelphia: Harper & Row, 1982.
2. Spellacy WN, Gravem H, Fisch RO. The umbilical cord complications of true knots, nuchal coils, and cords around the body. *Am J Obstet Gynecol* 1966; 94:1136-42.
3. Williams J, Katzman G, Kripke S. Neck compression by nuchal cord. *Am J Obstet Gynecol* 1981; 140:345-6.
4. Shepherd AJ, Richardson CY, Brown JP. Nuchal cord as a cause of neonatal anemia. *Am J Dis Child* 1985; 139:71-3.