



## **Management of the Nuchal Cord at Birth**

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### **ABSTRACT**

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Although nuchal cord is a common occurrence at birth, there is little attention to its importance or management at birth, and teaching includes premature clamping and cutting of the cord as the common option. Although grade 1 evidence is lacking, the optimal management of the nuchal cord, the Somersault manoeuvre is not taught or included in any current guidelines. What evidence there is, presented in this review?

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### **Introduction**

A nuchal cord is very common, present in 20% to 30% of births (1, 2). It is often perceived, especially by the lay public as a risk for the baby at an unattended birth. The perception is that the baby will be unable to deliver with its body remaining stuck in the birth canal (3). Although there are no formal guidelines, the general teaching on finding a nuchal cord, has been to attempt to bring the loop of cord over the baby's head or if this is not possible, to clamp and cut the cord (4, 5). The presence of the cord around the neck has sometimes been used to explain stillbirth or neonatal injury (6, 7). With such a high prevalence of 25% and only very small series of case reports, it is very difficult to obtain robust evidence about the precise risk for the neonate.

The published case reports reach different conclusions (8, 9). However with sufficient understanding of the physiology of the fetoplacental circulation, together with some case reports, it is possible to hypothesise how a nuchal cord may sometimes lead to an adverse outcome (10, 11). We will show that the main reason that a nuchal cord incurs any risk to the baby is the opportunity it provides for the accoucheur to clamp the cord early, even before the baby's body is delivered.

Although grade 1 evidence about how to deal with a nuchal cord is lacking, there is considerable evidence about how a nuchal cord

should not be managed (11, 12). An understanding of the physiology of the placental circulation helps to explain why clamping the nuchal cord may lead to hypovolaemia and with outcomes as serious as brain injury and death.

Oxygenated blood is returning to the baby from the placenta in the umbilical vein (13) at low (venous) pressure, while the baby's heart is pumping 40% of its combined output through the umbilical arteries at high pressure. Any compression of the cord will inevitably impede the flow of blood within the low pressure umbilical vein before the arterial flow is affected (14). This will result in a net increase in the blood volume within the placenta and a net blood loss within the fetal body (15). Although the cord is resistant to the effect of compression with the presence of Whartons jelly (16) and the turgor of the umbilical arteries (17), a nuchal cord does lead to a variable amount of compression.

The imbalance of blood volume caused by cord compression persists until after delivery. The relief of the cord compression and the physiological closure of the umbilical arteries before the closure of the vein results in a net gain by the newborn baby's body (18). Clamping the cord before release of the cord compression prevents restitution of the normal blood volume within the body of the baby and the neonate

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remains hypovolemic, and the placental circulation is remains engorged with blood.

The variable outcomes can be explained by the variable redistribution of blood volume which may occur with cord compression. If this is minor then clamping of the nuchal cord will result in a relatively mild hypovolemia of the neonate, while a large redistribution can lead to severe hypovolemia and hypovolemic shock in the neonate after clamping of the nuchal cord. In addition sometimes the cord may be loose enough to bring it over the baby's head before delivery of the shoulders and there may as a result be sufficient time after the body is delivered and before the cord is clamped for the return of a sufficient volume of blood to the neonate to avoid significant hypovolemia. A degree of hypovolemia will always occur if the cord is clamped early and this is seen in the universal anemia in the first few weeks of life after early cord clamping (19, 20).

The essential element for successful management of the nuchal cord is finding a way of avoiding clamping the nuchal cord, together with avoiding early cord clamping. Bringing the loose loop of over the baby's head is clearly the simplest. However a nuchal cord may not impede the descent and delivery of the body and indeed rarely does. When the cord is short and tight, or there are several loops around the neck, further descent of the body may be limited and another approach is necessary. The Somersault manoeuvre (21, 22) which involves placing the palm of the hand over the occiput and gently pushing the baby's head towards the mother's thigh. The baby's neck thus remains close to the mother's perineum and flexion of the head encourages flexion of the rest of the baby, resulting in flexion of the baby's body and delivery of the body by maternal effort. Once delivered the cord can be unwrapped and left intact to allow the trapped blood and the placental transfusion to return to the baby.

Resuscitation with ventilation may be needed while this is taking place over the next 3 to 5 minutes. Resuscitation with the cord intact can be achieved by a number of techniques (23). The simplest is to start ventilation with a bag and mask (24). Alternatively, with good

preparation before, a standard resuscitation trolley can be used to initiate resuscitation (25). A specifically designed small mobile trolley with full resuscitation facility is now available (26).

## Conclusion

Guidelines for the management of a nuchal cord need to be provided mainly to prevent unnecessary intervention. When intervention is required it should minimize the chance of premature clamping and cutting of the cord and use the somersault manoeuvre. The somersault manoeuvre needs to be more widely taught and included in training programs. A nuchal cord should be considered a labour room emergency and training for the correct management included in courses such as ALSO and PROMPT.

## Conflict of Interest

I have no financial interest in the Life Start trolley and all my Intellectual Property rights have been assigned to Inditherm in exchange for a donation to charity for each trolley sold.

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