



ORIGINAL ARTICLE

Time of cord clamping and neonatal complications, a prospective study[☆]



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KEYWORDS

Umbilical cord;
Cord clamping;
Ferritin;
Polycythemia;
Newborn

Abstract

Objective: To assess the effects of early or late clamping of the umbilical cord in at-term newborns, assessing the levels of hemoglobin, hematocrit, and ferritin, and their correlation with some of the complications.

Patients and methods: A prospective study of healthy newborns at term or born by dystotic or eutocic delivery in our hospital between May 2009 and May 2010. Patients were assigned according to the time of clamping, group 1 (<60 s), group 2 (1 to <2 min), and group 3 (2–3 min). Laboratory tests were performed at birth and at 48 h of life, assessing the levels of hemoglobin, hematocrit, ferritin, and bilirubin. The risk of polycythemia, respiratory distress syndrome, neonatal phototherapy or admission to the Intensive Care Unit and the hospital stay, were evaluated.

Results: A total of 242 patients were included: group 1 (g1 = 80), group 2 (g2 = 31) and group 3 (g3 = 131). The background maternal and neonatal characteristics were similar in all sets. The first test showed significant differences in ferritin levels in those infants with delayed clamping (g1: 111 mg/dl, g2: 125 mg/dl, g3: 173 mg/dl; $p < 0.01$). In the second analysis the values of hemoglobin (g1: 17.3 g/dl, g2: 18.9 g/dl, g3: 19.2 g/dl; $p < 0.01$), hematocrit (g1: 53.4%, g2: 58%, g3: 59%; $p < 0.01$) and ferritin (g1: 254 mg/dl, g2: 254.7 mg/dl, g3: 313 mg/dl; $p = 0.008$) were statistically higher in this group. As regards complications, a significant increase was observed in the number of cases of polycythemia symptoms in group 3.

Conclusions: The late cord clamping is associated with an increase in hematocrit, hemoglobin and ferritin at 48 h of life, as well as an increased risk of polycythemia present with symptoms.
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PALABRAS CLAVE

Cordón umbilical;
Pinzamiento de
cordón;
Ferritina;
Policitemia;
Recién nacido

Tiempo de pinzamiento del cordón umbilical y complicaciones neonatales, un estudio prospectivo**Resumen**

Objetivo: Evaluar los efectos del pinzamiento precoz o tardío del cordón umbilical en recién nacidos a término y su correlación con los niveles de hemoglobina, hematocrito, ferritina y ciertas complicaciones neonatales.

Pacientes y métodos: Estudio prospectivo en recién nacidos sanos, a término, nacidos por parto eutócico o distócico en nuestro hospital, entre mayo del 2009 y mayo del 2010. Se asignó a los pacientes según el tiempo de pinzamiento: grupo 1 (<60 s), grupo 2 (1 a <2 min) y grupo 3 (2 a 3 min). Se realizaron análisis al momento del nacimiento y a las 48 h de vida, valorando los niveles de hemoglobina, hematocrito, ferritina y bilirrubina. Se evaluó el riesgo de aparición de policitemia, síndrome de estrés respiratorio, fototerapia o ingreso en la Unidad de Cuidados Intensivos neonatal y el tiempo de estancia hospitalaria.

Resultados: Se incluyó a 242 pacientes: grupo 1 (g1=80), grupo 2 (g2=31) y grupo 3 (g3=131). Los antecedentes maternos y las características neonatales fueron similares en todas las categorías. El primer análisis demostró diferencias significativas en los niveles de ferritina de aquellos recién nacidos con pinzamiento más tardío (g1: 111 mg/dl, g2: 125 mg/dl, g3: 173 mg/dl; p<0,01). En el segundo análisis los valores de hemoglobina (g1: 17,3 g/dl, g2: 18,9 g/dl, g3: 19,2 g/dl; p<0,01), hematocrito (g1: 53,4%, g2: 58%, g3: 59%; p<0,01) y ferritina (g1: 254 mg/dl, g2: 254,7 mg/dl, g3: 313 mg/dl; p=0,008), fueron estadísticamente mayores en este mismo grupo. Al evaluar las complicaciones, observamos un aumento significativo en el número de casos de policitemia asintomática en el grupo 3.

Conclusiones: El pinzamiento tardío del cordón umbilical se asocia a un aumento en los niveles de hemoglobina, hematocrito y ferritina a las 48 h de vida y en el número de casos de policitemia asintomática.

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Introduction

Until recently, clamping of the umbilical cord was done a few seconds after birth. This was based on the rationale that early interruption of foetal circulation would be beneficial to the newborn by helping prevent complications such as polycythaemia, hyperviscosity, hyperbilirubinaemia, or transient tachypnoea.^{1,2} Likewise, early clamping has been recommended for certain situations, such as multiple births, to prevent twin-to-twin transfusion syndrome, and in children of HIV-positive mothers to minimise the risk of transmission.^{2,3}

At present, there is a tendency to recommend increasingly delayed clamping of the cord, on average 2–3 min after birth, and in some cases until the cord has ceased pulsating, after delivery.^{4,5} This shift is due to the multiple benefits that this practise can afford: higher haemoglobin and haematocrit levels, increased iron stores, and earlier and longer mother–child contact.^{6–9} It has been described that in preterm babies this practise also reduces the risk of intraventricular haemorrhage.^{10–13}

Under normal conditions, the blood volume of the foetus is around 70 ml/kg and the placenta contains about 45 ml/kg of foetal blood. When clamping of the cord is delayed, approximately 20–35 ml/kg of blood can be transfused to the newborn, increasing the foetal blood volume by up to 50%.¹⁴ This additional supply of red blood cells would also increase the iron reserves of the neonate by 30–50 mg,

reducing the risk of iron-deficiency anaemia in the first year of life.^{15,16}

Despite the published data, there is no global consensus on the ideal clamping time, and even on a European level, the health protocols and policies across different countries have not reached an agreement on this issue.¹⁷ However, a trend is starting to materialise in the current recommendations for neonatal resuscitation, which stipulate a delay in cord clamping of at least one minute for uncompromised babies.^{18,19}

Lastly, this debate has led to an increasing number of studies^{20–27} focused on determining the optimal timing for shutting down foeto-placental circulation and the advantages and/or disadvantages of delaying clamping of the umbilical cord.

Objective

The aim of this study was to assess the effects of early clamping (<60s) and delayed clamping (between 1–2 and 2–3 min) in at-term neonates born at the Fundació Hospital Sant Jaume d'Olot, evaluating potential differences in haemoglobin, haematocrit, and ferritin levels at 48 h of age, and the correlation of these levels with neonatal complications such as polycythaemia, hyperbilirubinaemia, respiratory distress syndrome, or admission to the neonatal intensive care unit.

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