To the Editor:

Human placental blood (PB) is increasingly used as a source of hematopoietic stem cells for transplantation. Since the first successful transplant in 1988, more than 50 pediatric patients have been engrafted by means of PB collected at the birth of full-term newborns, and large PB banking programs are arising both in the United States and in Europe. In this regard, concern has been raised about risks for the newborn associated to PB collection procedures because clamping of the umbilical cord "too early" could "deprive the baby of blood". To clarify this issue, we evaluated hemoglobin and bilirubin values during the first 4 days of life in 131 full-term newborns who had their PB collected and stored in our PB bank, established in Milan, Italy in 1993. The procedure was performed after vaginal delivery or cesarean section by an on-call staff from the blood bank. PB was collected by gravity in a blood collection bag containing 18 mL citrate-phosphate-dextrose by venepuncturing the free end of the umbilical cord. On 59 occasions, the umbilical cord was clamped within 30 seconds after delivery, and 76 mL PB was collected. When the umbilical cord clamping was delayed (35-180 seconds, n = 72), 39 mL PB was collected. As a control, hemoglobin and bilirubin values were evaluated in 75 full-term newborns who did not undergo PB collection. In the latter cases, the umbilical cord was clamped 20 to 120 seconds after collection.

As shown in Table 1, hemoglobin values were 17.4 ± 1.3 g/dL in newborns who had the PB collected after delayed clamping and 17.2 ± 1.5 g/dL in control subjects who had no PB collected. When the umbilical cord was clamped within 30 seconds and the PB collected, the hemoglobin value was 16.0 ± 1.1 g/dL. (P < .01 versus controls and newborns who had a delayed clamping of the cord, determined by unpaired Student's t-test). A weak negative relationship was found between the volume of PB collected and the newborn's hemoglobin value (r = -.42, P = .01). Length of hospital stay was 5 ± 2 days for each of the three newborn groups studied, and during the study period, none of the mothers and the newborns who had PB collected were reported to suffer from complications such as weight loss, fatigue while feeding, tachypnoea and tachycardia, hypoxia, or cardiac or pulmonary disease with reduced arterial oxygen saturation. Figure 1 shows the frequency distribution of hemoglobin values in newborns who had their PB collected from cords clamped within 30 seconds and in control newborns. The 95% confidence interval of the difference between the two groups ranged from 0.7 to 1.6 g/dL hemoglobin. Bilirubin values and the incidence of neonatal jaundice, as judged by the percent of newborns who required phototherapy (Table 1), were similar in the three groups studied (P = .78 by unpaired Student's t-test, and P = .53 by chi-square test, respectively).

This study confirms previous observations indicating that early clamping of the umbilical cord is (1) necessary to collect PB volumes

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**Table 1. Hemoglobin and Bilirubin Levels and Incidence of Jaundice in Newborns Who Underwent Placental Blood Collection and in Controls**

<table>
<thead>
<tr>
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<th>Newborns who Underwent PB Collection</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of cases</td>
<td>59</td>
<td>72</td>
</tr>
<tr>
<td>Time of cord clamping (sec)</td>
<td>20-30</td>
<td>35-180</td>
</tr>
<tr>
<td>PB collection volume (mL)</td>
<td>76 ± 22</td>
<td>39 ± 17</td>
</tr>
<tr>
<td>Hemoglobin (g/dL)</td>
<td>16.0 ± 1.1</td>
<td>17.4 ± 1.3</td>
</tr>
<tr>
<td>Bilirubin (mg/dL)</td>
<td>10.1 ± 2.9</td>
<td>11.6 ± 3.7</td>
</tr>
<tr>
<td>Incidence of phototherapy (%)</td>
<td>2.5</td>
<td>4.4</td>
</tr>
<tr>
<td>Length of hospital stay (days)</td>
<td>5 ± 2</td>
<td>5 ± 2</td>
</tr>
</tbody>
</table>

*Incidence of phototherapy is expressed as the percent of newborns who required phototherapy.*

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**Figure 1. Frequency distribution of hemoglobin values in newborns who had the umbilical cord clamped within 30 seconds after delivery and PB collected (II) and in control newborns (I).**
in the range associated to successful engraftment in recipients of PB transplants,\(^6\) and (2) associated with a slight, albeit statistically significant, reduction of hemoglobin values in the newborns.\(^8\) Although hemoglobin values of the newborns who had their cord clamped within 30 seconds were about 1.2 g/dL lower than those of controls, which corresponds to a loss of about 15 to 20 mg of iron, this difference did not influence the clinical parameters investigated. In conclusion, our data support the safety of procedures for the collection of adequate numbers of hematopoietic progenitors suitable for marrow reconstitution.

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REFERENCES

Placental blood collection: effects on newborns [letter] [see comments]

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