EVALUATION OF MILK PRODUCTION WITH A MULTI-USER, ELECTRIC DOUBLE PUMP WITH A SOFT FLANGE IN MOTHERS OF VLBW NICU INFANTS: A PILOT STUDY

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Background

Human milk is now the standard of care in the NICU. The cost of not using human milk is high, both in increased healthcare costs and short-term and long-term neonatal morbidity and mortality in a dose-response manner. In addition, pumping and providing milk for her baby contributes to the physical and emotional recovery of the mother. Unfortunately, if a mother delivers prematurely, it is often very difficult to establish and maintain a full milk supply through discharge and beyond. We would prefer infants to be breastfed at the breast but acknowledge that many mothers are unable to provide the early milk (colostrum) to enable early feedings for their infant, and many more suffer a decline in milk production during their infant’s prolonged hospital course.

We hypothesized that using the P&J’s Comfort® electric breast pump, mothers would be able to establish an adequate milk supply, comparable to larger, more expensive breast pumps, but with a comfortable silicone flange.

Objectives

Results

Human milk is now the standard of care in the NICU. The cost of not using human milk is high, both in increased healthcare costs and short-term and long-term neonatal morbidity and mortality in a dose-response manner. In addition, pumping and providing milk for her baby contributes to the physical and emotional recovery of the mother. Unfortunately, if a mother delivers prematurely, it is often very difficult to establish and maintain a full milk supply through discharge and beyond. We would prefer infants to be breastfed at the breast but acknowledge that many mothers are unable to provide the early milk (colostrum) to enable early feedings for their infant, and many more suffer a decline in milk production during their infant’s prolonged hospital course.

We hypothesized that using the P&J’s Comfort® electric breast pump, mothers would be able to establish an adequate milk supply, comparable to larger, more expensive breast pumps, but with a comfortable silicone flange.

Because of the physiology of human lactation, the first few days postpartum are crucial in establishing a full milk supply. Even though a tiny preterm infant may only consume 10 ml per 24 hours, it is important to establish a full milk supply within the first 7 to 10 days, so adequate milk is available when the infant is ready to nurse. Early, frequent, and effective breastfeeding or pumping appears to be the most important factor in establishing normal lactation.

Healthy breastfeeding mothers usually reach a volume of 300 ml (10oz) per 24 hours by 4-7 days postpartum. Research is minimal regarding the actual milk output after delivery at various gestational ages. However, milk output at one week is strongly predictive of milk output at 6 weeks post delivery.

Mean minutes pumping per 24 hrs: 118 min/24 hrs
Mean number of pumpings and mean minutes pumping per 24 hrs was not correlated with milk volume

Milk volume was not correlated with infant’s gestational age
Milk volume was not correlated with income
Milk volumes:

- 66% of mothers achieved ≥ 350 mL/day
- 50% of mothers achieved ≥ 500 mL/day
- 20% of mothers achieved ≥ 700 mL/day

Mothers of preterm infants in the US are dependent on a breast pump to establish and maintain a full milk supply. Early milk (colostrum) to enable early feedings for their infant, and many more suffer a decline in milk production during their infant’s prolonged hospital course.

Table 1: Characteristics of Study Group and Comparisons

<table>
<thead>
<tr>
<th>Current Study</th>
<th>HIll et al. 2005</th>
<th>P=NS (55)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean daily number of completed pumpings</td>
<td>29.2 ± 1.6</td>
<td>29.2 ± 1.7</td>
</tr>
<tr>
<td>Mean daily minutes of pumping</td>
<td>118 ± 11</td>
<td>118 ± 11</td>
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<tr>
<td>Mean milk output (mL/day)</td>
<td>350 ± 100</td>
<td>350 ± 100</td>
</tr>
<tr>
<td>Mean milk output (mL/day)</td>
<td>500 ± 150</td>
<td>500 ± 150</td>
</tr>
<tr>
<td>Mean milk output (mL/day)</td>
<td>700 ± 200</td>
<td>700 ± 200</td>
</tr>
<tr>
<td>Mean milk output (mL/day)</td>
<td>1000 ± 250</td>
<td>1000 ± 250</td>
</tr>
</tbody>
</table>

Mean Milk Volumes (mL/day) for Mothers with Complete & Incomplete Pumping Log

- 66% of mothers achieved ≥ 350 mL/day
- 50% of mothers achieved ≥ 500 mL/day
- 20% of mothers achieved ≥ 700 mL/day

Mean number of pumpings per 24 hrs: 7.4 (range 1.0 to 19.2)
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Mothers with complete pumping log: 50.0% vs 21.1% (P=0.001)
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Milk volume was not correlated with infant's gestational age
Milk volume was not correlated with income
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Methods

- Non-blinded, prospective trial of P&J’s Comfort® electric breast pump using a convenience sample compared to recent historical controls (HIll 2005) in a similar population of mothers of preterm infants (31 weeks gestation) in a Community Level III NICU during a 24 month period between Oct 2007 and Nov 2009.
- P&J’s Comfort® electric breast pump is an automatic cycling, variable speed and pressure, hospital grade, WHO Code-compliant, FDA-approved multi-user pump capable of double-pumping (pumping both breasts at the same time) with a soft collapsible silicone flange and carries a 3 year-warranty. It retails for $500-$600, considerably less than other multi-user, hospital grade pumps ($1,200-$1,400).
- Eligibility Criteria: (Same as Hill 2005)
  - Finnish, English or Spanish-speaking, ≥ 18 yr old, who could be reached by telephone
  - Intended to breastfeed and start pumping within 12 hrs post-partum
  - Demographic: preterm infant weighing ≥ 1,500 g at 31 weeks gestation
- Inclusion Criteria: (Same as Hill 2005)
  - History of thyroid or other endocrine disorders, breast surgery
  - Oral steroids or inhaled
  - Preeclampsia: hypertension such as preamputee or pregnancy-induced hypertension
  - Multiple pregnancy greater than twins
  - Maternal complications previously or in immediately post-partum and informed consent obtained
  - Study approved by Sharp HealthCare Institutional Review Board
- Mothers given a P&J’s Comfort® breast pump, a personal double-pumping kit, tote and PJs to keep.
- Mothers approached prenatally or immediately post-partum and informed consent obtained
- All mothers demonstrated their knowledge of how to use the pump and their understanding of the study protocol.
- Instructed to pump 8 to 10 times per 24 hrs for minimum of 15 minutes, or for 2 minutes after last drop of human milk volume increases (beginning at 15 mL).
- Demographic questionnaire and clinical data form completed
- Instructed to pump 8 to 10 times per 24 hrs for minimum of 15 minutes, or for 2 minutes after last drop of human milk volume increases (beginning at 15 mL).
- Demographic questionnaire and clinical data form completed
- After instruction, all mothers demonstrated their knowledge of how to use the pump and their understanding of the study protocol.
- Instructed to pump 8 to 10 times per 24 hrs for minimum of 15 minutes, or for 2 minutes after last drop of human milk volume increases (beginning at 15 mL).
- Demographic questionnaire and clinical data form completed

Conclusions

- Mothers of preterm infants in the US are dependent on a breast pump to establish and maintain a full milk supply.
- Many women experience difficulties in providing enough milk for early trophic feeds and later milk feeding.
- Milk volumes obtained with P&J’s Comfort® breast pump were equal to those reported by Hill et al. 2005, in a similar population, and equal to or better than a more recently published study (Wahir et al. 2011)
- P&J’s Comfort® multi-user pump is a viable alternative to larger, more expensive pumps for establishing an adequate milk supply in mothers of VLBW infants in the NICU.
- Techniques for milk expression are investigated and improved. It is our hope that the opportunity (and burden) of providing milk will be made easier for mothers of preterm infants.

References


Conflict of Interest Declaration: The study was partially funded by LactiMed, Inc., manufacturers of P&J’s Comfort® breast pump. In that study subjects were given a P&J’s Comfort® breast pump to keep. The primary investigator (NWS) received no funding for the study.