PRELIMINARY RESULTS OF A PROGRAM TO REDUCE UNNECESSARY C/SETIONS BY INCREASING THE USE OF VACUUM EXTRACTION

Barbara Nolens, John Lule and Vacuum Extraction Interest Group Mulago Hospital Kampala Uganda
New and underutilized technologies to reduce maternal mortality: call to action from a Bellagio workshop
must be promoted, along with operations research on their cost-effectiveness for home use during the third trimester of pregnancy.

3.5. **Obstructed labor**

Key technologies to prevent and treat obstructed labor:
- Simplified cesarean section techniques
- Partograph
- **Vacuum delivery equipment**
- Symphysiotomy
- Tocolytics
- Misoprostol for labor induction

more use that is widespread. A supply of partographs must be available to all who assist at labors, especially in rural areas.

3.5.3. **Vacuum delivery equipment**

Vacuum extraction delivery equipment and training must be made available and accessible, especially to midwives. Manufacturers should provide equipment that is more durable.

3.5.4. **Symphysiotomy**

In addition to compiling existing evidence on symphysiotomy, researchers should conduct long-term follow-up studies, studies to evaluate the technique as performed by providers at different
Background

Table 3 Top 20 (highest scoring) research priority questions to improve maternal and/or perinatal health outcomes between 2015 and 2025

<table>
<thead>
<tr>
<th>Research question</th>
<th>NRPS</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate the effectiveness of interventions (e.g. counselling or incentives, or home visits) to increase post-abortion contraception uptake and continuance, and reduce repeat abortion</td>
<td>100</td>
<td>Abortion</td>
</tr>
<tr>
<td>Evaluate the effectiveness and costs of strategies to improve the quality and utilization of maternity services (e.g. maternity waiting homes, improved communication via mobile phones, community awareness strategies) to improve early detection and management of antenatal and intrapartum complications</td>
<td>95</td>
<td>Health systems</td>
</tr>
<tr>
<td>Develop and evaluate strategies for locally appropriate transport, communication and referral systems for obstetric and newborn emergencies</td>
<td>94</td>
<td>Health systems</td>
</tr>
<tr>
<td>Evaluate the effectiveness and cost of strategies to prevent, detect and treat causes of anaemia in pregnancy (e.g. malaria, occult bleeding disorders, nutritional deficiencies)</td>
<td>93</td>
<td>Antenatal care</td>
</tr>
<tr>
<td>Evaluate the effectiveness and cost of strategies to prevent, detect and treat obstetric complications (e.g. obstructed labour, assisted delivery techniques)</td>
<td>88</td>
<td>Labour and delivery</td>
</tr>
<tr>
<td>Evaluate the effectiveness of training skilled birth attendants to gain and maintain competence in the management of obstructed labour, and assisted delivery techniques</td>
<td>88</td>
<td>Labour and delivery</td>
</tr>
<tr>
<td>Evaluate the effectiveness and cost of training skilled birth attendants in intrapartum fetal monitoring and neonatal resuscitation for reducing stillbirths and deaths/disability due to perinatal asphyxia</td>
<td>88</td>
<td>Neonatal care</td>
</tr>
<tr>
<td>Evaluate the effectiveness of a package of interventions for the prevention, early detection and treatment of puerperal sepsis (e.g. sterile birth kits, access to antibiotics, automated thermometers)</td>
<td>88</td>
<td>Other (puerperal sepsis)</td>
</tr>
<tr>
<td>Evaluate the effectiveness and cost of a package of mobile service interventions delivered at community level, including contraception, antenatal care, and skilled birth attendants</td>
<td>87</td>
<td>Health systems</td>
</tr>
</tbody>
</table>

nr 10 out of 190
Table 2. Defining “Signal Functions” of Basic and Comprehensive Emergency Obstetric and Newborn Care (EmONC)

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Signal EmONC Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Centers</td>
<td>Basic Emergency Obstetric and Newborn Care (BEmONC)</td>
</tr>
<tr>
<td></td>
<td>1. Antibiotics</td>
</tr>
<tr>
<td></td>
<td>2. Anticonvulsants</td>
</tr>
<tr>
<td></td>
<td>3. Uterotonics</td>
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<tr>
<td></td>
<td>4. Manual removal of the placenta</td>
</tr>
<tr>
<td></td>
<td>5. Assisted vaginal delivery</td>
</tr>
<tr>
<td></td>
<td>6. Removal of retained products</td>
</tr>
<tr>
<td></td>
<td>7. Newborn resuscitation</td>
</tr>
<tr>
<td>Referral Facilities (Hospitals)</td>
<td>Comprehensive Emergency Obstetric and Newborn Care (CEmONC)</td>
</tr>
<tr>
<td></td>
<td>Basic EmONC plus:</td>
</tr>
<tr>
<td></td>
<td>1. Cesarean sections</td>
</tr>
<tr>
<td></td>
<td>2. Blood transfusion</td>
</tr>
</tbody>
</table>

Note: Previously, BEmONC was defined as six signal functions—newborn resuscitation has been added.
BENEFITS OF VACUUM EXTRACTION

• Reduced need for surgical intervention
  - less complications (PPH, infection, anaesthesia)
  - faster maternal recovery
  - net saving of resources

• A shorter decision to delivery interval
  - improved neonatal and maternal outcome

• No uterine scar
  - less risk of future uterine rupture
  - less risk of placenta previa, accreta, increta
Objectives

Implementation of what we already know works:

vacuum extraction
Where to start?

Mulago National Referral Hospital

33,345 deliveries in 2012
- complicated referrals
- vacuum extraction rate: 0.5%

Every year:
- 10-20 gynaecologists
- interns
- midwives

Many of them serve “up country” after leaving Mulago Hospital.
Where to start?

Using the existing medical education system
Limiting factors according to Mulago Hospital staff

- Lack of skilled staff: 70
- No vacuum extractor: 60
- No training opportunities: 50
- Concern HIV transmission: 40
- Concern trauma to baby: 30
- Should be done by specialist: 20
- CS safer for mother: 10
- No vacuum if CS is possible: 5
- Obsolete: 5
- Other: 5

n=103
more than 1 answer possible
### Trauma to the baby?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Vacuum n=59,354</th>
<th>CS during labour n=84,417</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subdural/cerebral hemorrhage</td>
<td>8.0</td>
<td>7.4</td>
<td>0.9 (0.6-1.4)</td>
</tr>
<tr>
<td>Intraventricular hemorrhage</td>
<td>1.5</td>
<td>2.5</td>
<td>1.6 (0.8-3.6)</td>
</tr>
<tr>
<td>Subarachnoid hemorrhage</td>
<td>2.2</td>
<td>1.2</td>
<td>0.5 (0.2-1.2)</td>
</tr>
<tr>
<td>Convulsions</td>
<td>11.7</td>
<td>21.3</td>
<td>1.8 (1.4-2.4)</td>
</tr>
<tr>
<td>CNS depression</td>
<td>9.2</td>
<td>9.6</td>
<td>1.1 (0.7-1.5)</td>
</tr>
<tr>
<td>Feeding difficulty</td>
<td>72.1</td>
<td>117.2</td>
<td>1.6 (1.4-1.8)</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>39.1</td>
<td>103.2</td>
<td>2.6 (2.3-3.0)</td>
</tr>
<tr>
<td>Death before discharge</td>
<td>3.0</td>
<td>8.0</td>
<td></td>
</tr>
</tbody>
</table>

Incidence is expressed as number of cases per 10,000 infants

**Authors conclusion:** A substantial proportion of morbidity may be due to abnormal labour rather than to the procedure.

HIV transmission?

<table>
<thead>
<tr>
<th>HIV transmission by mode of delivery</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>elective CS (809)</td>
<td>8.2%</td>
</tr>
<tr>
<td>non elective CS (895)</td>
<td>16.8%</td>
</tr>
<tr>
<td>spont. vaginal (4971)</td>
<td>16.4%</td>
</tr>
<tr>
<td>instrumental (520)</td>
<td>18.3%</td>
</tr>
</tbody>
</table>

C-section in 2\textsuperscript{nd} stage?

- Meta analysis 1999, 70% not on HAART
- Effect of delay in second stage on MTCT
- RCOG guideline: “Bloodborne infections of the mother are not contraindication for instrumental delivery.”
- Cochrane: softcup to prevent scalp laceration

Method: finding out opinion of staff

If you had prolonged second stage yourself...

- **Specialist**: 90% (vacuum) 10% (CS) 0% (not sure)
- **Midwife**: 60% (vacuum) 30% (CS) 10% (not sure)
- **SHO**: 70% (vacuum) 30% (CS) 0% (not sure)
- **Student**: 50% (vacuum) 40% (CS) 10% (not sure)
Methods: providing equipment
Methods: training

**MULAGO HOSPITAL GUIDELINE FOR VACUUM EXTRACTION**

**Indications**
- Delay in the second stage of labour
- Need to shorten the second stage of labour for maternal medical condition
- Maternal exhaustion
- Fetal distress in the second stage of labour

**Absolute contraindications**
- Breach, face or brow presentation, transverse lie
- Incompletely dilated cervix in a nulliparous patient
- Unengaged fetal head: 2/5th or more palpable per abdomen
- Gestation < 34 weeks
- Cephalo-genoic disproportion

**Relative contraindications**
- Incompletely dilated cervix in a multiparous patient
- HIV positive patients
- Measuring grade 3 (irreducible overlapping skull bones)

*Note: This is a guideline. The health provider has to decide if a vacuum extraction is indicated or not in every specific case. See the full guideline for background information.*

Abdominal palpation for descent of the fetal head

- 5/9ths palpable per abdomen
- 2/5th palpable per abdomen
Methods: data collection

- Rates of vacuum extraction, FSB, MSB, END and MD before and after implementation
- Maternal and perinatal outcomes in a cohort of vacuum extraction and failed vacuum extraction cases during 6 months (n=342)
Results

vacuum extractions per month

> 1000 vacuums done
Results

Vacuum extraction, FSB and MSB rates per 3 months

![Graph showing vacuum, FSB, and MSB rates over time with a vertical line indicating the start project date.]

- Vacuum
- FSB
- MSB


Start project
# Results

## Total Deliveries

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Follow Up</th>
<th>Difference</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Deliveries</td>
<td>12.143</td>
<td>11.770</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Vacuum Extraction

<table>
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<th>Baseline</th>
<th>Follow Up</th>
<th>Difference</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perinatal Death</td>
<td>1112 (9.12%)</td>
<td>975 (8.28%)</td>
<td>-9.2%</td>
<td>0.0178</td>
</tr>
</tbody>
</table>

## FSB

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Follow Up</th>
<th>Difference</th>
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### Graph

The graph shows the trend of total deliveries and vacuum extractions from 2012 to 2014, with a notable increase in vacuum extractions post-project start.
Results

Perinatal death rate: baseline and follow up
Results: where did new specialists go?
Results: where did new specialists go?
Implementation was successful

After implementation in Mulago Hospital perinatal outcomes improved

Mulago Hospital can play an important role in implementing vacuum extraction throughout the country
Vacuum extraction is one of the known interventions that can improve maternal and neonatal outcomes
Thank you for your attention

For enquiries about the project or skills training on vacuum extraction: bnolens@yahoo.com
SYMPOSIUM
SURGERY IN LOW RESOURCE SETTINGS
NOVEMBER 14TH–16TH 2014

WHAT IS YOUR ROLE?

LAB111 Amsterdam - www.surgicalneed.nl