Inter-facility KMC .... Saving babies

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### Algorithm 1: Referral and Transfer of Patients

<table>
<thead>
<tr>
<th>REFERRING STAFF</th>
<th>RECEIVING STAFF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Doctor's duties:</strong></td>
<td><strong>Doctor's duties:</strong></td>
</tr>
<tr>
<td>* calls NICU at next LOC</td>
<td>* Determine the most appropriate bed availability and inform the referring doctor</td>
</tr>
<tr>
<td>* Discusses patient details with receiving doctor</td>
<td>* Inform the referring doctor</td>
</tr>
<tr>
<td>* Inform parents of transfer including information pertaining to:</td>
<td>* Inform the transport team</td>
</tr>
<tr>
<td></td>
<td>* Direct the ambulance to the hospital where a bed is available</td>
</tr>
<tr>
<td></td>
<td>* Inform the transport team</td>
</tr>
<tr>
<td><strong>Reason for transport, medical condition, implications</strong></td>
<td><strong>Length of time transport will take</strong></td>
</tr>
<tr>
<td><strong>When transport will occur</strong></td>
<td><strong>Mode of travel</strong></td>
</tr>
<tr>
<td><strong>Nursing manager's duties:</strong></td>
<td><strong>Preparation of patient documentation and referral letter</strong></td>
</tr>
<tr>
<td>* Staff and family members who may accompany the newborn during transport</td>
<td><strong>yes</strong></td>
</tr>
<tr>
<td>* Visiting hours and telephone number of the receiving hospital</td>
<td></td>
</tr>
<tr>
<td>* Provide labelled samples to the ambulance team if neonate stable</td>
<td>neonate managed by referring doctor till bed becomes available</td>
</tr>
<tr>
<td>* Collate all documentation (see below)</td>
<td>neonate unstable OR</td>
</tr>
<tr>
<td>- Maternal blood sample (clotted)</td>
<td>receiving doctor directs the ambulance to a hospital where a bed is available</td>
</tr>
<tr>
<td>- Unpreserved placenta if available</td>
<td></td>
</tr>
<tr>
<td>* Collate all documentation (see below)</td>
<td>neonatally trained paramedic dispatched to referral hospital</td>
</tr>
<tr>
<td>neonate transferred in KMC if possible by ambulance staff</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Documentation/information to accompany the patient will be prepared by the referring staff and should include (when available) a legible copy of the following:
  - Mothers Antenatal record (BANC booking card)
  - Newborns Road To Health booklet with HIV status
  - Nursing notes
  - Doctor's notes/consultation and transfer summary
  - Relevant lab reports and x-rays
  - Medicine Drug Chart
COMMUNICATION
communication communications

• On call staff

• Ambumedics

• Referral hospital

• Staff : doctors / nurses

• Follow - up

• Don’t forget the parents
DOCUMENTATION TO ACCOMPANY BABY

• Mom: BANC Card
• Baby: RTHC
• NOTES
  – Nursing
  – Doctors
• Medicine chart
• Relevant blood results
AIM OF CARE DURING TRANSPORT

• Warm environment
• Adequate supply of O2
• Adequate nutrition
• Developmental supportive environment
• Careful observations
• Vital signs
• Assess pain
• Blood glucose
• Lines and tubes
• Environmental stress
WARM ENVIRONMENT

• Closed incubator
• OR
• Skin to skin kangaroo care
• Keep head warm with cap
COMPLICATIONS DURING TRANSPORT

- Hypothermia / Hyperthermia
- Hypoxia
- Hypoglycaemia
DEVELOPMENTAL SUPPORTIVE ENVIRONMENT

• Protect and enhance each infant’s developmental progress (Protect his vulnerable brain)

• Reduce detrimental environmental stimulation (STRESS!!!)
DEVELOPMENTAL CARE GOALS

• Minimize stress experienced by infant
• Helps infant to achieve balance
• To conserve energy for growth
• It nurtures the infants personal developmental agenda
PHYSIOLOGICAL CHANGES DUE TO ENVIRONMENTAL STRESS

• Increased or decreased heart and respiratory rates
• Changes in skin colour
• Decreased SPO2
• Inability to tolerate feeds
• Altered interaction with time out signals
• Altered motor function
NEURO DEVELOPMENTAL SYSTEMS

• Visual (light)

• Auditory (noise)

• Somatosensory (tactile, handling, smell)

• Neuromotor development (positioning)
SIGNS OF STRESS

• Colour change
• Change in resp rate and pattern
• Change in heart rate
• Extension or limpness of extremities
• Open or gaping mouth
STRESS CUES
Crying
Arching and extension
Arching and crying
Finger splaying
Extension of extremities
Newborn infant, especially premature infant’s brain is EXTREMELY sensitive and has limited ability to protect itself from harmfully effects of NICU.
Fig. 4.8. Appearance of the brain at post-mortem and on ultrasound at 26 weeks' gestation: (a) the superficial appearance of the brain; (b) the midline cut surface; (c) a tangential view; (d) a midline view; (e) a coronal section.
Fig. 4.13. Appearance of the brain at post-mortem and on ultrasound at term: (a) the superficial appearance of the brain; (b) the midline cut surface; (c) a tangential view; (d) a midline view; (e) a coronal section.
Grade I—Subependymal hemorrhage only

Grade II—Intraventricular hemorrhage without ventricular dilation

Grade III—Intraventricular hemorrhage with ventricular dilation

Grade IV—Intraventricular hemorrhage with parenchymal hemorrhage
Increased stimulation (bright light, noise, touch) that the infant experiences, contributes to the physiological instability, disrupting the process of normal growth and development.
CALMING TECHNIQUES

• Positive touch

• Nest to mimic uterine boundaries

• Non nutritive sucking

• Sedation and pain control

• Kangaroo Mother Care
Developmentally supportive care moves from protocol-based to process-based care

Necessary to observe infant cues and organize care to MEET THE INFANT’S NEEDS and not the caregiver’s needs
Going from this.....

KMC - changing attitudes

To this!

to save lives
• Term “Kangaroo” derived from practices similar to marsupial care

• Infant kept warm in a maternal pouch close to the breast with unlimited feeding
What is KMC?

Kangaroo Mother Care

- KMC is the early, prolonged and continuous (if possible) skin-to-skin contact between a mother and her newborn infant.
Kangaroo Mother Care (KMC)

- A simple, inexpensive way to care for new born infants
- The stable infant is placed skin to skin against the mother’s chest, wearing only a nappy and cap
- The baby is kept upright between the mother’s breasts, inside the mother’s blouse, and held in place by a cloth wrapped around the mother and baby
- This method is especially suited for LBW & premature infants but is also beneficial in term infants
Origins of KMC

• The KMC programme was developed in Bogota, Colombia in 1978 in response to overcrowded nurseries with high rates of infection and mortality in the face of resource and manpower shortages.
Origins of KMC continued

• It stimulated a *worldwide* interest and numerous clinical studies as the infants in Bogota were found to have lower morbidity and mortality rates.

• It is now being used in both developed and developing countries as part of neonatal care programmes and has been highlighted by UNICEF *(Accepted as NDoH policy in 2011 to implement KMC in all hospitals in the region)*
Kangaroo Mother Care is a **Basic Right of the newborn**, and should be an integral part of the management of low birth weight and full term newborns, in all settings and at all levels of care, in all countries.

INTERNATIONAL KMC FOUNDATION
...IN ALL SETTINGS

...AT ALL LEVELS
AMBULANCE...BETWEEN FACILITIES, REFERALLS
Air Ambulance
Components of KMC

Kangaroo Position

Kangaroo Discharge

Kangaroo Nutrition

Supportive Environment

Supportive Environment

Supportive Environment
How does KMC work?

**Autonomic Nervous System**

- Regulates digestive tract
- Promotes growth
- Promotes neurodevelopment
- **↑ stress**

**Sympathetic Nervous System**
- Fight or flight
- Survival
- Not conducive to growth
- **↑ stress**

**Parasympathetic Nervous System (Vagal Nerve)**
- Regulates digestive tract
- Promotes growth
- Promotes neurodevelopment
- **↓ stress**

**Hypothesis: Vagal Nerve Stimulation**
Vagal Nerve Stimulation

Skin-to-skin contact & suckling causes vagal stimulation

Stimulation back of palate

Skin-to-skin care
KMC: Benefits to the Baby

- Improved cardiac & respiratory stability
- Improved gastrointestinal function
- Higher initiation & duration of breastfeeding
- Good temperature regulation
- Decreased energy expenditure
- Satisfactory weight gain
KMC: Benefits to the Baby

- Protection against infections
  - Immunological protection provided by breast milk
- Neurological protection (from stress)
  - Improved neurodevelopment
  - Better organised sleep patterns
  - Organised electrical brain activity
KMC Improves Sleep Organization

EEG and polysomnographic measurements were compared in incubator infants versus infants receiving skin-to-skin care.

Arousal decreased, REM decreased—analagous to more mature sleep organization.

SSC may be used to improve sleep organisation.
What do we see during KMC?

In KMC:
- Normal cycling
- Non-chaotic pattern

48 hour baseline chaotic pattern of activity and quiet HR & RR
KMC is a smiling matter for mothers and their babies.....for smaller
WET RESUSCITATION

• STABILIZATION OF PREM
  – Babies (< 2 kg)
  – Wrap in food-grade, heat-resistant plastic bags/wraps without drying infant, HAT!
......and larger
LOADING/ POSITIONING INTO KMC

- Hand hygiene
- Secure mother to seat or stretcher
- Secure infant to BARE CHEST of MOTHER, father, granny, EMS
- Secure lines and tubes to prevent dislodgement. Stick onto shoulder of person holding baby.
- Tie KMC Wrap around mother and baby
- Infants Airway open
- Hat on head
Putting baby skin to skin for transport

- Temp Regulation better on HIGHER part of chest
- Place baby BETWEEN breasts
- Big boobs.....baby on top of Breasts
Kangaroo Position

Skin-to-skin on mother’s chest

Author: E v Rooyen, University of Pretoria, South Africa
Putting baby skin to skin for transport

- Chin of Mother/ Father/ EMS must touch the head of baby
- Baby’s head in a sniffing position to keep airway open at all times
KMC Position

• Place the baby between the mother’s breasts in an upright position
• Turn the head to the side, in a slightly extended position
  – This is to keep the airway open
  – It also allows eye-to-eye contact between mother and baby

  ▪ Avoid forward flexion & hyperextension of the neck
  ▪ Infant should be in a flexed position - legs & arms
    ▪ Secure baby with a binder / wrap
    ▪ The top of the binder should be at the baby’s ear

WHO KMC practical guide
Putting baby skin to skin for transport

- Tie baby line from ear to nose
- Take wrap under mother's arms.
- Tie tight. Baby says “UUHH”!
- Tie knot at the back of baby’s head
Putting baby skin to skin for transport

- Tie the binder firmly enough so that the baby will not slide out
- Make sure that the tight part of the cloth is across the baby’s chest
- The baby’s abdomen should not be constricted
- Baby should have enough room for abdominal breathing
- Examples of different binders:

WHO KMC practical guide
Triangular Bandage
Putting baby skin to skin for transport

Mother positioned in semi fowlers position
Support from Health Staff (facility and community based)

- Explain the concept of KMC to the mother and demonstrate how it is done
- Explain the benefits of KMC
- Integrate family members like father, grandmother, aunts, or other person, depending on the cultural set up
- Help the mothers with any problems related to positioning, feeding
Putting baby skin to skin for transport
Putting baby skin to skin for transport

Smell breast milk

NB NB
Mother with infant before kangaroo transport (back transfer from a neonatal intensive care unit). The infant is in kangaroo position on the mother’s chest. The fabric is wrapped around the caregiver and infant in a sling-like fashion such that it covers the whole body of the infant securely.
Mother with infant at arrival after kangaroo transport in an ambulance over a long distance (400 km, 5 hours).
Mother with infant after **kangaroo transport (40 minutes)**. An additional blanket is placed on top of the mother and infant. Shown is a transfer in 1 hour after birth because of tachydyspnea (35 weeks’ gestational age, 2070 g).
Father and infant after kangaroo transport (back transfer, day 32, 1580 g, 90 km, 80 minutes).
Mother with infant during kangaroo transport in a **helicopter** (back transfer after abdominal surgery).
Skin 2 Skin for all babies

Healthy babies shouldn’t be separated from mom.

Vernix is good for babies. Washing can be delayed and baby can stay with mom.
Promotes - Stable Vital Signs

Bonding

Breastfeeding
Prolonged KMC in Labour Ward....
And Transfer to the Post Natal Ward
KMC in the Post Natal Ward especially at 1800gr
Twins in the Post Natal Ward

For bio-synchrony

and breastfeeding
KMC - TWINS
KMC in the NICU & High Care
Benefits to the Mother

• The mother's confidence in caring for her infant is boosted
• Improved bonding between mother and infant due to the physical closeness between them
• Mothers are empowered to play an active role in their infants care
• Mothers are enabled to become the primary care giver of their infants
• Breast feeding is promoted

Affonso D, et al 1989, PEP unit 43 Principles of KMC
Even at 600gr
• Psalms 22:9.

• "Yet you are He who took me out of the womb; You made me hope and trust when I was on my mother's breasts.”
Nurseries in our country have high workloads because of resource shortages and high incidence of complicated pregnancies and LBW babies.

- Less crowding in nursery because KMC infants discharged earlier & grow faster
- Cheaper than incubator care
- Mothers empowered to care for their babies
- Fewer readmissions to hospital from home
- Fewer infections in the nursery
- “Humanizes” nursery
For proud dads too!

Even if they overheat their babies
Proud Dads....

Some babies may want to suckle

They all need ambulatory KMC
KMC IN THE KMC WARD
To be continued at home after early discharge, especially in the case of low birth weight infants, until at least 10th week of postnatal gestational age.
KMC for transfers and at discharge
Kangaroo Discharge

- The mother continues to practice KMC after the infant is discharged home.
- Once the baby is feeding well, maintaining stable body temperature in KMC position and gaining weight, mother and baby can go home.
KMC IS GOOD FOR:

- BABIES
- MOTHERS
- BREASTFEEDING
- HEALTHSERVICE
Florence Nightingale

- Put the patient in the best environment to care for him
THANK YOU