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EDITORIAL

Dear Friends
Season's Greetings !

It is my privilege to present to you another issue of IAPNEOCHAP Bulletin. IAPNEOCON 2014 was held in Meerut on 1st-2nd November. The conference was very well organized in all aspects including its academic content. On behalf of IAP Neonatology Chapter office I would like to thank the whole team of IAPNEOCON 2014. Dr Amit Upadhyay deserves special thanks and appreciation for managing this conference. I am confident that Neonatology and awareness of Neonatal care will get a boost in Uttar Pradesh after this Scientific Event. I would also like to congratulate the Department of Neonatology KEM Hospital Mumbai (Dr. NK Kabra, Dr RN Nanavati & Dr. Bonni) for their award winning research. Report and few pictures of the conference has been published in this bulletin.

IAP Neonatology Chapter app is now available on apple app store and can be downloaded on iphone and ipad. Please do update the application to view the recent changes. I request all the fellowship students and fellowship coordinators to visit the website www.iapneochap.org as some of changes has been made in fellowship technical information page.

Wish you all A Very Happy New Year 2015 !

With warm regards
Naveen Bajaj
Guest Editor

IAP NEOCON 2014

(November 1st-11nd, Meerut)



Management of Pain in Newborns

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Babies in the neonatal intensive care unit (NICU) may experience in addition to separation from mother, a myriad of painful procedures and stressful experiences.

Definition

As per the International Association for the Study of Pain taxonomy (IASP), PAIN is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Do newborns experience pain?

The inability to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of pain relieving treatment. Although previously it was suspected that newborns perceive no or less pain, it is now clear that even premature newborns have the pain perception system in place since 24 weeks. A newborn including a preterm FEELS, RESPONDS TO and REMEMBERS pain ! (1). In fact, their pain perception may be heightened because of immaturity of descending inhibitory pathways. The mechanosensory receptors may overlap with the C fibres of pain and premature newborns perceive some non nociceptive stimuli as painful. Further, they have a lower threshold for pain and wide receptive fields.

What is the effect of neonatal pain?

The newborn pain experience, in addition to immediate transient effects such as alteration in vital signs, desaturations, increase in serum cortisol could result in permanent alteration of the pain pathways causing hyperalgesia, sensitization and affect neurodevelopment. The experiences of the newborn infant control the development of synapses. Normally, the number of synapses in the brain of the neonate is "pruned back" because there is an overproduction of synapses at the time of birth. Daily experiences of the infant determine which synapses are retained and which are pruned. Repetitive painful experiences may result in the retention of a high number of synapses that would otherwise be deleted or in the formation of abnormal connections. The result of these abnormal connections and higher numbers of synapses may be increased sensitivity to pain (2). Repeated painful procedures in the premature infant may cause excessive activation of excitatory amino acids and NMDA receptors, leading to damage to the developing neurons. Effects of damage to developing neurons may include a decreased pain threshold, or "windup" phenomenon, and central sensitization. Central sensitization means that the spinal cord neurons become more responsive to all input. Recent studies suggest that NMDA-mediated mechanisms may lead to a susceptibility to chronic pain states in persons who have experienced repeated painful experiences (3). There is sufficient evidence that repetitive pain is harmful in newborns, with possible short and long term consequences on growth and neurodevelopment (4-6) Especially preterm neonates develop altered pain sensitivity and mal adaptive behavior later in life. The response of the ELBW infants attenuate rapidly showing more rapid behavioral and physiologic dampening during infancy. The resting heart rate increases suggesting a possible long term "resetting" of autonomic regulation. On follow up infants are less reactive to everyday bumps at 18 months corrected age. In preterm neonates, the outcome assessment has many confounders. However it is shown that the pain of circumcision in a growing preterm without analgesia sensitizes the infant to greater perception of pain during analgesia.

Recent studies have shown that greater pain experience in the neonatal period is associated with lower scores on motor and mental indices of BSID at 18 months and poorer growth in preterm infants (6,7).

What is the burden of pain during NICU stay?

In the first 14 days, the sick newborns in the NICU undergo almost 14 painful procedures per day. In a study in our

unit (8), we found that each NICU baby was subjected to 8.09 ± 5.53 painful procedures and 17.24 ± 5.62 disturbances everyday. The commonest painful procedures documented were heel prick (30%), removal of adhesives (29%), IV injections (16%), oral suction (9%), venipuncture (7%) and endotracheal suctioning (6%). Babies with lower birth weight and gestational age had significantly higher number of painful procedures as compared to normal weight term babies.

How to assess for newborn pain?

Accurate assessment of pain is vital to ensure optimal effectiveness and safety of pain management therapy in NICU neonates. As the neonates cannot self report or use the visual analogue scale, physiologic (heart rate, saturations, respiration, blood pressure) , - and behavioral indicators (eye squeeze, nasolabial furrow, cries) are used as a surrogate for self report(9). Behavioral responses are more specific to pain whereas physiological measures are more indicative of stress and not as specific as for pain. Bedside indicators of pain are:

- Behavioral – cry, grimace, whimpering, groaning, moaning, listless, agitated
- Motor – clenched fists, stiff, limb withdrawal, swiping, thrashing, rigidity, flaccidity
- Autonomic – tachycardia, desaturations, increase in blood pressure, pallor, flushing
- Visceral – vomiting, feed intolerance,

It is also important to understand that the behavioral and physiologic responses to pain are modified with increasing gestational age at birth, increasing postnatal age, and previous experiences thus making any one pain scale difficult to use in all neonatal populations. There are more than 40 tools (Table 1) available for assessment of pain. Each unit should be familiar with one appropriate tool and use it effectively. Of all the tools, only the PIPP score and the N-PASS tools are modified based on gestational age. The tools can be further classified as tools for **procedural pain, post operative pain, acute and prolonged pain.**

Despite various assessment tools, consistent use of a tool in a non research setting is challenging. Pain has to be treated as the 5th vital sign and nurses should be educated regarding pain identification and management. **The golden rule is that what is painful for an adult is painful for the newborn- and some more!!**

Table 1: Summary of Neonatal Pain Tools

Tool	Description	Age	Type of Pain
PIPP	Premature infant pain profile	28-40 weeks	Procedural, postoperative pain
CRIES	Cries, Requires oxygen, Increased vital signs, Expression, Sleeplessness	32-56 weeks	Post operative
NFCS	Neonatal Facial Coding System - has only behavioral component	25-40 weeks	Procedural
SUN	Scale for use in Newborn	Term & preterm	Procedural
COMFORT Neo	Modification of COMFORT score	24-42 weeks	Prolonged

EDIN	Neonatal Pain and discomfort scale. Has only behavioral component	25-36 weeks	Prolonged
NIPS	Neonatal Infant Pain Scale	28-38 weeks	Procedural
N-PASS	Neonatal Pain Agitation Sedation Scale	0-100 days	Acute & prolonged pain. Tool for sedation
PAPSI	Pain Assessment Scale for Preterm Infants	<37 weeks	Procedural
BPSN	Bernese pain scale for neonates	27-41 weeks	Procedural

We have used the PIPP score for most of our studies on pain (8,10) .

Table 2: Premature Infant Pain Profile

Indicator	0	1	2	3
GA	>36	32-35	28-31	<28
State	Active Awake	Quiet Awake	Active Sleep	Quiet Sleep
HR increase	0-4	5-14	15-24	25
SaO ₂ decrease	0-2.4%	2.5-4.9%	5-7.4%	>7.5%
Brow bulge	0-9% of time	10-39% of time	40-69% of time	>70% of time
Eye squeeze				
Nasolabial furrow				

< 6 no/minimal pain, > 12- mod/severe pain

What is new in the assessment of pain?

- **Heart rate variability:** It is the interval between heart rates affected by sympatho-parasympatho balance and assessed by power spectral density analysis. Pain reduces heart rate variability.
- **Skin conductance algometer (SCA) :** SCA increases with pain. This reflects the sympathetic nervous system influenced by changes in emotions, which releases the acetylcholine that acts on muscarine receptors, causing a subsequent burst of sweat and increased skin conductance. The SCA reflects changes in

norepinephrine levels induced by nociception better than heart rate, Heel prick increases but sucrose unexpectedly increases it. (11)

- **NIRS (Near infrared spectroscopy)** – It is a non invasive method of assessing brain haemodynamic function based on changes in blood hemoglobin. Pain changes NIRS suggesting neural activity in somatosensory cortex. Sucrose reduces PIPP but not activity in NIRS.
- **Multimodal pain assessment tools** includes electroencephalogram (EEG), NIRS, electromyogram (ENMG), Video (behavioral), Autonomic (HR, RR, SaO₂) assessments (12).
- Markers of stress (salivary cortisol levels) and oxidative stress (uric acid and malonyldialdehyde)

Management of pain can be either general measures or specific measures.

General measures to reduce pain (Contextual strategy)

1. Limit number of procedures.
2. Cluster care.
3. Reduce “routine” tests. Do tests if they are going to modify management.
4. Do only necessary procedures - Eg – Endotracheal suctioning only when there are secretions and not as a routine.
5. Plan invasive procedures when the baby is awake. Protect sleep
6. Once a procedure is over, do not plan another procedure for at least two hours
7. Minimize the number of attempts per procedure.
8. Use a lancet instead of needle for heel pricks (13).
9. Use the smallest G needle.
10. Avoid IM / SC injections when the same can be given through an existing IV cannula.
11. Removal of plasters: Use saline/ sterile water /oil for wetting the plasters before removal. Do not apply traction perpendicular to the skin.

Specific measures to reduce pain

- **Non pharmacological methods**
- **Pharmacological methods**

1. Non pharmacological methods

Behavioral strategy methods: These strategies involve either direct (e.g. rocking) or indirect (e.g. non-nutritive sucking; care-giver provides soother) manipulation of the infant's body by a care-giver.

- a. Swaddling / Facilitated sucking:** swaddling is when an infant is securely wrapped in a blanket to prevent the child's limbs from moving around excessively. Facilitated tucking involves firmly containing the infant using a care-giver's hands on both head and lower limbs to maintain a 'folded-in' position.
- b. Kangaroo mother care (KMC):** the infant is placed on their care-giver's bare chest during a painful procedure or for soothing after a painful procedure. We found that KMC caused a reduction of 2.1 PIPP score during heel prick (KMC mean score 8.6, control mean score 10.7) (14)
- c. Sensorial saturation:** Multiple stimuli are simultaneously given to reduce pain so that all the senses are

satisfied. KMC is one form of sensorial saturation.

- d. **Non nutritive suck** - an object (e.g. pacifier, non-lactating nipple) is placed into an infant's mouth to stimulate oro-tactile or sucking behaviors during a painful event.
- e. **Rocking/ holding** or both: an infant is held or gently moved up and down or side to side (or both) by a caregiver.
- f. **Massage:** Touch/massage: an infant's body is 'stroked' to provide some type of counter-stimulation to the nociceptive input.
- g. **Music/ parents voice**

Of the above strategies, Cochrane meta-analysis 2011 has found that the interventions with largest standardized mean difference (SMD) for treatment were nonnutritive sucking (SMD -1.45, 95% CI -2.34 to -0.57), kangaroo care (SMD -1.12, 95% CI -2.04 to -0.21), swaddling/facilitated tucking (SMD -0.97; 95% CI -1.63 to -0.31) and rocking/holding (SMD -0.75; 95% CI -1.20 to -0.30) (15)

Physiologic interventions:

- a. **Oral sucrose:** There is overwhelming evidence (level of evidence 1) that 24 % sucrose reduces procedural pain. The mean reduction in pain scores is -2.05 (95% CI - 3.08- -1.02) (16). However, it is recently questioned as a true analgesic. Though it reduces the behavioral pain scores, the nociceptive brain specific activity as determined by electroencephalography is unchanged (17) . Further oxidative stress is increased by use of sucrose (18) . Studies have used sucrose as a single event analgesic. But if sucrose (0.5 to 1 ml) is to be used for every painful procedure, considering an average of about 10 procedures per day, the newborn would be exposed to sucrose equating half a litre of coke everyday (19) !!! Repeated use of sucrose > 10 doses / day may be detrimental to the neurodevelopment particularly motor development and attention. (20). Hence, though sucrose is now available in India, it would be prudent to consider use of another analgesic that is also well studied and very safe i.e. expressed breast milk.
- b. **25% Dextrose:** It has been shown to reduce pain scores (10). Compared to sucrose, glucose is 0.75 times as sweet and 25% dextrose is commercially available as sterile ampoules. It's use was more prevalent when sucrose was not available in India.
- c. **Expressed breast milk:** Breast milk also has analgesic properties and has been found to reduce pain from procedures. The analgesic effect of breast milk may be related to the sweetness of breast milk (presence of lactose in breast milk) or higher concentration of tryptophan, a precursor of melatonin that increase the concentration of beta endorphins. Being a natural food, it would be the most ideal and safe analgesic. Also it is readily available, easy to use and can be repeated without risk. Our study (10) showed that both 25% dextrose and breast milk decrease pain response (behavioral and physiologic) to venipuncture in newborn babies as assessed by the PIPP score. The mean crying time, heart rate and oxygen saturation changes at 0, 1, 3, 5 minute after venipuncture were significantly reduced in the 25% dextrose or breast milk group as compared to placebo (sterile water), and the analgesic effect persisted till 5 minutes after the procedure.
- d. **Breastfeeding** not only reduces pain but also stress. It is one of the most natural pain reduction measures. It is better than massage. However it may not be feasible in the NICU where the sick babies may not be ready to breastfeed. This modality can be used for pain relief during immunization (21) .

Pharmacological methods:

This includes drugs such as opioids, benzodiazepines, barbiturates, paracetamol , propofol, ketamine and local anaesthetics (22). These are mainly used for post operative pain and in ventilated newborns. Opioids are used most often in ventilated babies.

- Opioids:
 - o Morphine 0.05-0.1 mg/kg iv per dose (0.0-0.03mg/kg/hr as infusion)
 - o Fentanyl 0.5-3mcg/kg iv (0.5-2mcg/kg/hr as infusion)
 - o Others are methadone ,sufentanil,alfentanil,remifentanil

- Paracetamol 10-15mg/kg orally;20-30mg/kg per rectal

- Local anaesthetic : lidocaine and topical anesthetics

Opioids reduce pain, But safety is a concern. Opioids can frequently result in hypotension, poor respiratory efforts, decreased gut motility, urinary retention and chest rigidity (fentanyl). In the NOPAIN study preterm ventilated infants were randomized to 3 arms – morphine, midazolam and controls. Both morphine and midazolam reduced pain scores; morphine reduced but midazolam increased intraventricular bleed, periventricular leukomalacia and mortality (23). The NEOPAIN study using morphine showed higher hypotension and worse composite outcome (24). Cochrane meta analysis found no difference in mortality and neurodevelopmental outcome, but time to reach full feeds was longer (25). The effect on long term neurological outcome is also not clear. Pre-emptive morphine in preterms may result in lower head circumference, poorer memory and lower IQ (26) at 5 years. But at 8-9 years, there are also reports of improved executive functions (27). Fentanyl infusion in preterms has found to reduce acute pain but not prolonged pain and was associated with higher side effects. Currently the evidence is insufficient to recommend routine use of opioids.

Benzodiazepines and barbiturates are sedatives and not good analgesics. Midazolam is a frequently used sedative but is associated with side effects such as respiratory depression, hypotension, exposure to benzyl alcohol and reduced cerebral blood flow. It was associated with longer hospital stay and increased incidence of poor outcome in the NOPAIN trial(23) The Cochrane meta-analysis which included two more studies also found a longer hospitalization (28).

Table 3: Opioids as Analgesics- Dose and half life

Drug	Relative dose / kg	Half life		
		Preterm	Term	Child
Morphine	0.1 mg	9-10 h	6.8	2.2
Fentanyl	1-5 ug	6-32 h	4.2	3.5
Sufentanil	0.2-1 ug	N/A	12.3	2.3
Alfentanil	5-25 ug	N/A	8.8	1.4
Remifentanil	0.25–1 ug	N/A	3-10 min	3-10 min

Paracetamol has been found to be safe and helps in reducing morphine requirements. It is routinely used post operatively. Ketorolac and ketoprofen may reduce morphine requirements and are under evaluation.

Elective intubations: It is currently recommended that all infants prior to elective intubation should receive an analgesic (fentanyl / remifentanyl), a muscle relaxant (succinylcholine / mivacurium) and atropine / Glycopyrrolate (22). It would be prudent to restrict use of muscle relaxants to only those health personnel whose are skillful in intubation and are not under supervised training. Propofol for intubations may be associated with significant cardiovascular risk and is not recommended (22).

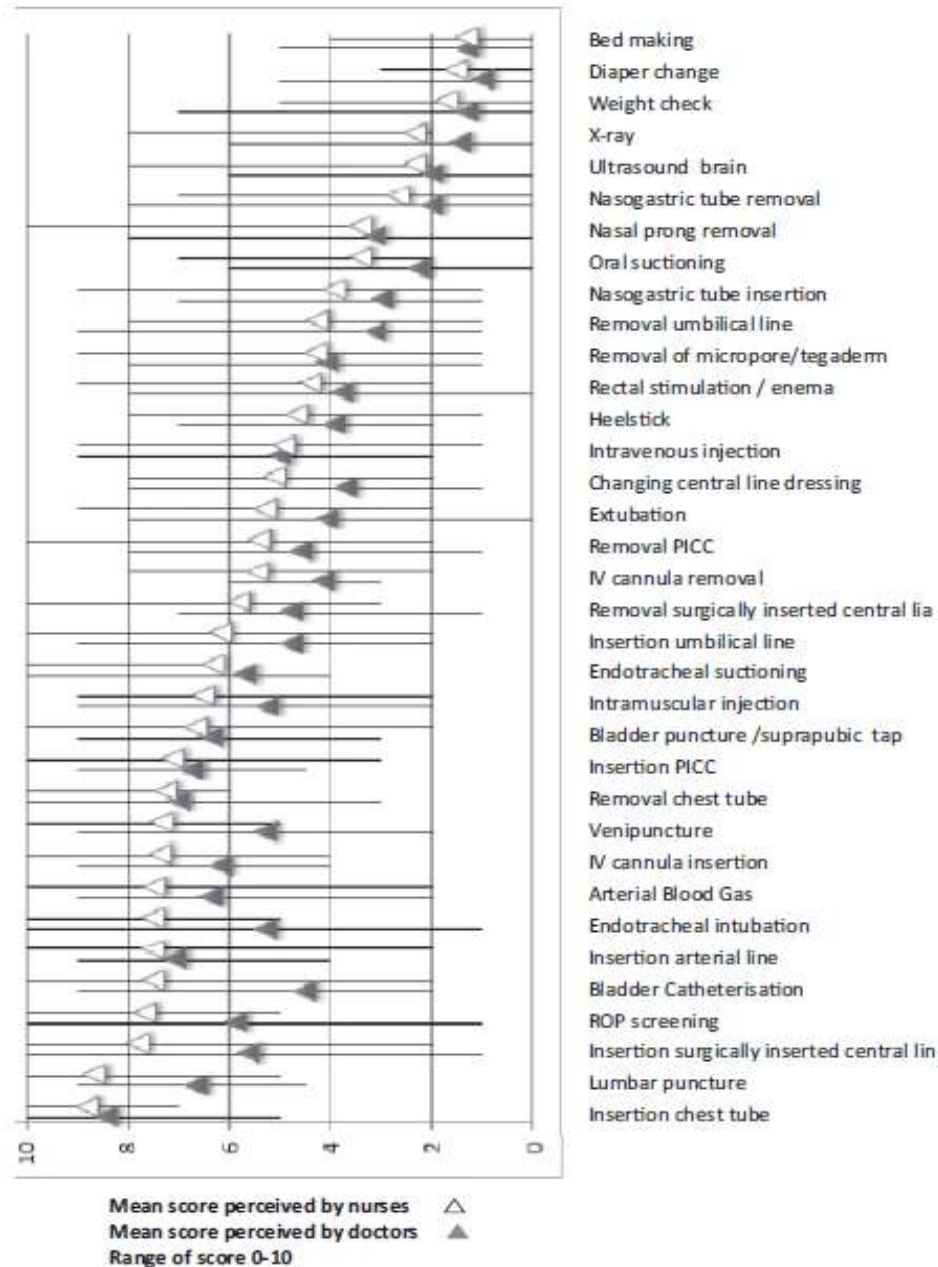
Table 4: Suggested Pain Relief Measures During Specific Interventions.

Procedure	Non intubated neonates	Intubated neonates
Venipuncture, heel lance, arterial puncture/line placement	2 ml EBM 2 min prior	2 ml EBM 2 min prior
Lumbar puncture, Suprapubic aspiration	2 ml EBM 2 min prior	2 ml EBM 2 min prior or 1-3 ug/kg fentanyl IV
Elective intubation	N/A	1-3 ug/kg fentanyl IV
Endotracheal suction	N/A	2 ml EBM 2 min prior or 1-3 ug/kg fentanyl IV
Immunization	Breastfeeding or 2 ml EBM 2 min prior	
UAC /UVC placement	2 ml EBM 2 min prior	1-3 ug/kg fentanyl IV
Mechanical ventilation	NA	1-3 ug/kg fentanyl IV sos or 4-6 hourly 1 ug/kg/hour if severe agitation
Chest tube drainage	Local anesthesia 0.5 % - 1 ml/kg SC 2 ml EBM 2 min prior 1-3 ug/kg fentanyl IV*	Local anesthesia 0.5 % 1 ml/kg SC 1-3 ug/kg fentanyl IV
ROP screening	2 ml EBM 2 min prior 0.5 % proparacaine	1-3 ug/kg fentanyl IV 0.5 % proparacaine
Laser	Paracetamol 2 hours prior and after Q 6 h till 24 h 1-3 ug/kg fentanyl*	Paracetamol 2 hours prior and after Q 6 h till 24 h 1-3 ug/kg fentanyl
Post operative	Paracetamol	Paracetamol / IV fentanyl

Evidence- practice gap

Despite the overwhelming evidence on the need for pain relief in newborns, the actual practice is far from satisfactory. In our study (8), though the health personnel were aware and perceived many of the NICU procedures as severely painful (> 7 score on 10) (Fig 1), use of pain relief measures were reported to be used in only 46.4% of the time. In other studies, use of pain relief measures ranged from 22% to 46% during mechanical ventilation, Routine treatment postoperatively was reported in 41% (29).

Fig 1: Pain score for various procedures as perceived by health care professionals (8)



Conclusions

In a practical sense, every NICU should have a program to reduce pain for the NICU patient. This program should include a comprehensive stepwise approach with avoidance of painful procedures as much as possible, followed by nonpharmacologic and then pharmacologic methods for pain relief. Because the projected pain is expected to become more severe, increasingly potent drugs (with increasing complications) should be used. An effective pain relief program also provides education for all healthcare providers

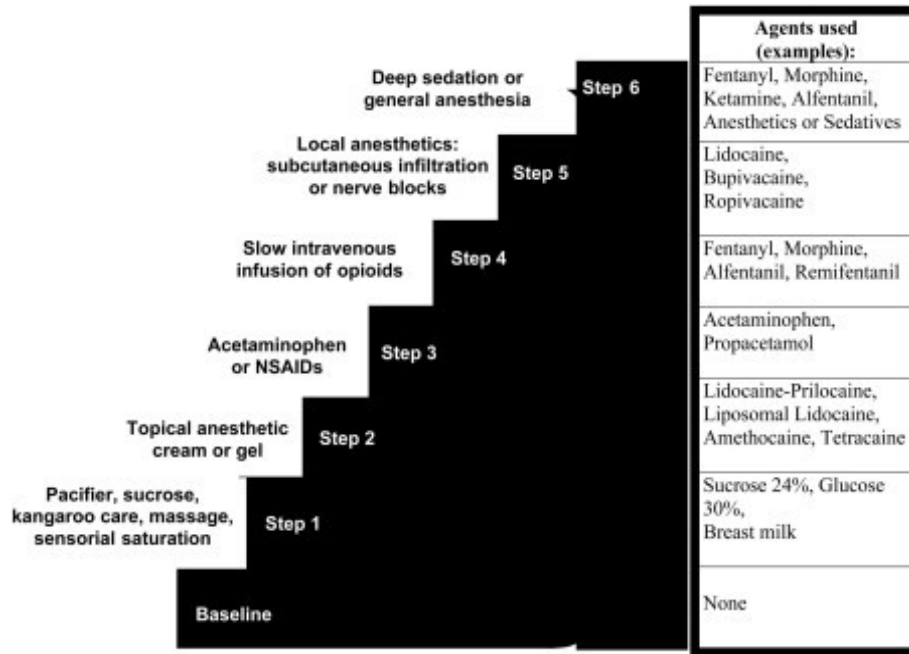


Fig 2: Stepwise Approach for the Management of Acute Pain in Neonates (30)

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Frequently Asked Questions : Retinopathy Of Prematurity (ROP)

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What is ROP?

A developmental, vascular, proliferative disorder of retina.

Which classification is used to describe ROP?

International Classification of ROP (ICROP) is used. ICROP describes vascularization of the retina and characterizes ROP by its position (zone), severity (stage), and extent (clock hours).

Which babies should be screened for ROP?

All babies less than 32 weeks gestational age (up to 31 weeks and 6 days) or less than 1501 g birthweight should be screened for ROP. One criterion to be met for inclusion.

Whom will you not screen for ROP?

Infants of 37 weeks' gestation and greater do not need to be screened for ROP, even if they do have an unstable course.

When will you screen?

4 weeks after birth or 32 weeks Post Menstrual Age whichever is later.

However this criterion gets redefined based on the experience of the centre and audit of ROP done over period of time.

When to perform repeat screen for ROP?

The recommendation for the timing of a repeat examination is determined by the ophthalmologist based on the findings of the first examination.

Risk factors in ROP.

Prematurity is the single most risk factor for development of ROP

What are criteria to decide about treatment for ROP?

Previous guidance recommended treatment when the disease reached 'Threshold'.

Treatment for ROP should be undertaken if any of the following indications are reached:

- Zone I, any ROP with plus disease
- Zone I, stage 3 without plus disease
- Zone II; stage 3 with plus disease

When to stop screening for ROP?

- When vascularisation has extended into zone III eye examinations may be stopped. This usually happens after 36 completed weeks postmenstrual age.
- In the presence of ROP, screening for progressive active disease may be discontinued when any of the following characteristics of regression are seen on at least 2 successive examinations:
 - a) lack of increase in severity

- b) partial resolution progressing towards complete resolution
- c) change in colour in the ridge from salmon pink to white
- d) transgression of vessels through the demarcation line
- e) commencement of the process of replacement of active ROP lesions by scar tissue

How to dilate the pupils?

Pupils are dilated with Phenylephrine 2.5% and Tropicamide 0.5%. One drop of Tropicamide is instilled every 10-15 minutes for 4 times starting 1 hour before the scheduled time for examination. This is followed by phenylephrine, one drop just before examination. Phenylephrine is available in 10% concentration; it should be diluted 4 times before use in neonates. Repeated instillation of phenylephrine is avoided for the fear of hypertension.

What precautions are taken during examination?

- The examinations should be kept as short as possible
- ensure that emergency situations can be dealt with promptly and effectively.
- Discomfort to the baby should be minimized by administering oral sucrose, nesting, swaddling and/or the use of a pacifier just before examination
- Baby should not have been fed just before examination to avoid vomiting and aspiration.
- Hand washing should be done and asepsis maintained.

How do you optimize use of oxygen to prevent ROP?

- continuously monitor oxygen administration using pulse oximeter
- Avoid hyperoxia or hypoxia
- Avoid fluctuations in oxygenation
- Target 88-92 % SpO₂

How do you make use of judicious oxygen to prevent ROP?

Transfusion of packed RBCs is a factor of ROP. Adult RBCs are rich in 2,3 DPG and adult Hb binds less firmly to oxygen, thus releasing excess oxygen to the retinal tissue.

Packed cell transfusions should be given when hematocrit falls below following ranges: ventilated babies 40%, babies with cardio-pulmonary disease but not on ventilators 35%, sick neonates but not having cardiopulmonary manifestations 30%, symptomatic anemia 25% and asymptomatic anemia 20%.

Good practices to prevent ROP?

- Use prenatal steroids
- Target oxygen saturations & ensure alarm limits on pulse ox
- Avoid fluctuations in oxygenation
- Have a policy for transfusion
- Screen all preterms < 32w/ < 1500 g for ROP at 1 month age
- written protocol in relation to the screening for, and treatment of, ROP. This should include responsibilities for follow-up of babies transferred or discharged from the unit before screening is complete, which should

be the responsibility of the named consultant Neonatologist for each baby.

- follow-up out-patient appointment must be made before hospital discharge and the importance of attendance explained to the parents.

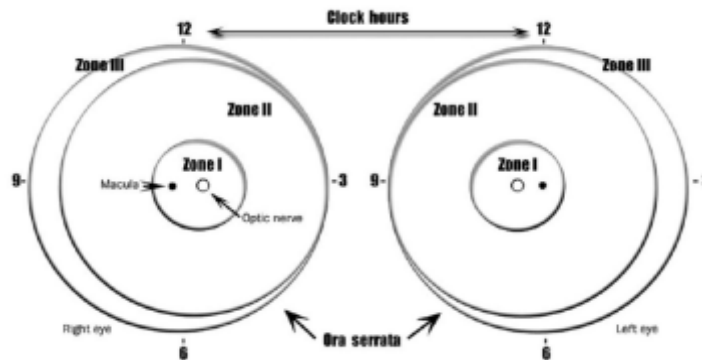


Fig 1.. IROCP Classification: Position (Zone), Severity (Stage), Extent (Clock Hours)

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IAP Neonatology Chapter Mobile App



IAPNEOCON 2014 CONFERENCE SUMMARY

Seventh National conference of IAP Neonatology chapter (IAP NEOCON 2014) was organized as a joint effort of Department of Pediatrics, LLRM Medical College, Meerut and NNF Meerut branch and IAP Meerut branch on 1st and 2nd November 2014. 436 doctors and nurses from different regions of India and abroad came over to Meerut to take part in this conference.

The highlights of the conference are enlisted below:

1. It was the first opportunity that this kind of conference was organized in Western Uttar Pradesh. This conference not only benefited Pediatricians in Private sector and government medical Colleges, but it also involved PMS Doctors of Uttar Pradesh Government and MBBS students as well. A total of 436 persons including 60 eminent faculties and 376 delegates attended the conference. Amongst them 130 Doctors from different medical colleges, 110 private practicing Pediatricians, 30 Doctors from UPPMS, 68 staff nurses and 38 undergraduate medical students were benefited from this two days event.
2. Nurses being the pillars of good neonatal care and outcome were included in a big way. 68 nurses were trained in 2 different workshops. 29 nurses from Nursing Training College were trained and certified in the accredited IAP Neonatal Resuscitation, Training of Trainers programme. 39 nurses posted in PHC, FRU, CHC and SNCU in district hospital and medical College SNCU were trained in FBNC pattern. Conference started with eight concurrent workshops. Neonatal ventilation workshop focused on different aspects of ventilation, types and working principals. Participants were trained with hands on exercises and reading modules. Workshop on WHO protocols was organized to provide thorough knowledge of different neonatal emergency management as per WHO guidelines. Around 40 participants including private practitioners, PG students, and Pediatricians in Government setup were also trained for use of tablets and smart phone in case management through this workshop. Three different workshops were also conducted to train around 100 candidates including SNCU staff nurses, Doctors posted at District hospitals and MBBS students. In these workshops different work stations were designed to train participants regarding importance of Breastfeeding in neonatal life, Kangaroo Mother Care (KMC), Basic Neonatal Resuscitation steps, Proper method of Neonatal transport and Equipments used in NICU. Workshop for Training of Trainers was also conducted through which around 30 trainers were trained in Neonatal Resuscitation. These trainers are going to teach correct methods of resuscitation to staff nurse and health care workers in periphery so that neonatal mortality and morbidity because of asphyxia can be reduced. A workshop for neuro-developmental assessment of neonates on follow up was also organized through which around 40 Pediatricians learned in what to see and how to evaluate if a baby comes on follow up. This workshop sensitized Pediatricians for early recognition of symptoms and planning intervention accordingly.
3. In all 8 WORKSHOPS were conducted. Teaching module and workshop schedule is being attached with this copy. Activities in different workshops are highlighted below. They are-
 - i **Neonatal ventilation:** This workshop focused on different aspects of neonatal ventilation including indications, complications and when to discontinue ventilatory support. It pinpointed about the do's and don'ts and the common mistakes which has to be taken care of during ventilation. Private Practitioners, Senior residents and PG students from all over India participated in the workshop.
 - ii. **Neurodevelopmental follow up of infants:** In this workshop participants were sensitized to pick up early symptoms of poor neurodevelopment on follow up in babies, who had bad neonatal period like, prolong NICU hospitalization, Birth asphyxia and required ventilator support etc. Different assessment tools were discussed through teaching module and showing videos. A soft copy of all teaching material and videos were provided to all participants.

- iii. **Procedures & Good NICU practices:** This workshop was tailored to train all the participants regarding good NICU practices. They were shown the best way of doing day to day procedures in N I C U through hands on exercises on neonate simulator. This workshop was scheduled especially for residents.
- iv. **WHO Protocols:** This workshop focused on WHO standard protocols for management sick neonates. It was designed for Private Practicing Pediatricians, Govt. Doctors, who were updated about latest treatment protocols. Through different workstations participants learned about common neonatal emergencies and its management. Course coordinator also trained all participants about use of smart phone and tablets in managing a sick neonate.
- v. **Breast feeding, KMC & SNCU Care at District level Hospital:** This workshop was organized for staff nurses involved in care of neonates in peripheries and at District Hospitals. Participants were trained regarding importance of breastfeeding, correct technique and solving common problems regarding breast feeding in day to day life. They were told about importance of KMC (Kangaroo Mother Care) and correct technique of KMC was explained through video podcast. Nurses were also told about how to use common equipments in nursery, basic steps of neonatal resuscitation and correct technique of transporting a baby to higher centre.
- vi. **Programme for Doctors (SNCU care, Basic Neonatal Resuscitation, Basic Newborn Care & Equipment care):** Pediatricians and Doctors posted under U.P. Government at SNCU units came to attend this workshop, where they were trained in Basic steps of neonatal resuscitation with the help of neonatal simulators, Correct method of use and maintenance of common nursery equipments. Course coordinator highlighted common problems faced in postnatal wards and their management.
- vii. **BNCRP (Basic Neonatal Care and Resuscitation Programme) for Final Year Students:PILOT Course-** This workshop was especially designed for MBBS Final year students, who learned about the basic steps of neonatal resuscitation on Neonatal simulators. They came to learn about common neonatal problems and their management.

Following workshops, conference started on 1st November at 2pm. This conference was inaugurated by the Chief Guest, a Neonatologist and writer of international fame, the former Head of Department of Pediatrics, All India Institute of Medical Sciences, New Delhi, Prof. Meherban Singh at 5:10 pm on 1st Nov. 2014. The Guest of Honor was Dr. Pradeep Bharti Gupta, Principal and Dean, LLRM Medical College, Meerut. After that various scientific sessions by famous Neonatologists were held which added glory and brilliance to the conference (programme copy attached). Penal discussions on common neonatal problems like neonatal jaundice, feeding issues in Preterm babies and neonatal sepsis were conducted by the most meticulous and eminent Neonatologist in their field. The sessions imbibed knowledge in every mind sitting in the conference and solved the raised queries. Three award papers were presented in evening, judged by 3 eminent neonatologists and the paper from Surya Hospital, Mumbai won the best paper award. The paper was "To assess the efficacy and safety of polythene wrap in prevention of hypothermia in preterm and low birth weight infants during neonatal transport- A randomized controlled trial" presented by Dr Suketu Rajnikant Bhavsar.

2nd day of conference started with 30 research papers being presented in oral and posters presentations. Through these research work presentations participants came to know about hidden facts and knowledge in the field of Neonatology. This session was planned to promote research activity in young Pediatricians and making the house aware of different newer modalities of treatment in this field. Best paper in Free paper category was awarded to "Nasal Mask versus Nasal Prongs for delivering nasal CPAP (NCPAP) in preterm infants with respiratory distress – A Randomized Controlled Trial" by Sorabh Goel, Jayashree Mondkar, Alpana Utture, Swati Manerkar, Deeparaj Hegde,

Department of Neonatology, LTMMC, Mumbai. Cash prize of upto Rs 6000/- were awarded for different papers to different papers.

Following this scientific session started with the excellent lecture delivered highlighting rationale and judicious use of antibiotics and role of probiotics in preterm neonates. Dr. Ashok Deorari, an eminent Neonatologist and faculty at Department of Pediatrics, AIIMS, New Delhi came over to address Dr. B B Jha Oration. He made the house realize that saving a newborn baby is our duty as well as every Pediatrician's responsibility. The Plenary session was sponsored by UNICEF. Dr Deorari also sought attention of everyone in the house while explaining about ONTOP (Online Training Programme on Management of Sick Newborns). He said, this programme is benefitting number of pediatricians including PG students all across the country. He added the importance of E-Learning in management of sick newborns. He also pointed out that several software's and smart phone/tablets applications has been made which can be easily downloaded and used as a guide during management of sick neonates especially in remote areas by any health care worker.

Under “**Save the Children**” campaign Dr. Renu Srivastava and Dr. Rajesh Khanna addressed the house and spread awareness regarding current status of neonates in India as well as trend of neonatal mortality over last several decades. Dr. Renu Srivastava told that major contributor to Neonatal mortality lies in central part of India including Uttar Pradesh. In view of this Newborn Baby corner at delivery room, Newborn stabilization unit (NBSU) at First Referral Unit (FRU) and Sick Newborn Care unit (SNCU) has been made at District Hospitals and Medical Colleges to provide meticulous care to Newborn babies. She pointed out that more than 1800 SNCUs are running all across country which is determined to provide best neonatal care. Continuing with this Dr Rajesh Khanna added, WHO and UNICEF have jointly launched Bill and Malinda Gates funded, INAP (Indian Neonatal Action Plan) in Sept 2014. He said, INAP defines the latest evidence on effective interventions which will not only help in reducing the burden of stillbirths and neonatal mortality, but also maternal deaths. He added, INAP has clearly marked timelines for implementation, monitoring and evaluation, and scaling-up of proposed interventions. It is expected that all stakeholders working towards improving newborn health in India will stridently work towards attainment of the goals of “**Single Digit NMR by 2030**” and “**Single Digit SBR (Stillbirth Rate) by 2030.**” Dr Ashok Deorari read out the PLEDGE formulated by “Save the Children” group and read it out to the participants. Along with him, all the participants pledged to work for the benefit of newborn babies at any cost and in any situations.

The conference was a huge success as it has lit a lamp in every participant's heart, including doctors and staff nurses to work hard in a new and better way for improving neonatal outcomes. The organizing committee comprised of all the faculty of Department of Pediatrics and members of Indian Academy of Pediatrics and National Neonatology Forum of Meerut Branch. This conference has added another feather in the hat of Department of Pediatrics, LLRM Medical College and of course Meerut city.

POSTERS PRESENTATION

1. RANDOMIZED, PLACEBO-CONTROLLED, DOUBLE-BLIND TRIAL OF ANALGESIC EFFECT OF EXPRESSED BREAST MILK OR ORAL SUCROSE IN PROCEDURAL PAIN IN PRETERM NEONATES- PRELIMINARY RESULT By Dr. Shivani Bansal et al
2. RELATIONSHIP OF BODY WEIGHT GAIN AND THE DEVELOPMENT OF RETINOPATHY OF PREMATURITY IN EXTREMELY LOW BIRTH WEIGHT INFANTS By Dr. Praveen Kr. Singh et al.
3. To compare the therapeutic efficacy of common salt to gentian violet and copper sulphate for the treatment of umbilical granuloma. By Dr. Manan Kamboj et al.
4. COLLOIDION SYNDROME with severe Ectropion- A rare congenital anomaly. By Neha Raghava
5. Umbilical Cord Morphology & Pregnancy Outcome. By Ashok Kumar et al.

6. Isovaleric Acidemia. By Prashant kumar
7. Duration of respiratory support in VLBW babies in Indian NICU- an Audit IAP NEONATOLOGY CHAPTER RESEARCH GROUP. By Shivanagouda
8. Cord Nucleated RBC as a Marker of Perinatal Hypoxia in Newborn. By Anirudh Ghai
9. Bilateral Spontaneous Pneumothorax with Subcutaneous Emphysema. By Iraj Alam khan
10. Planter response in preterm and small for gestational age neonates: a comparative study. By Dr. Priyanka Gupta
11. Clinical Profile of Newborn with Persistent Pulmonary Hypertension at a Tertiary Neonatal Intensive Care. By Siddharth Agrawal
12. OBSERVATIONS ON MORTALITY AND MORBIDITY PROFILE OF VERY LOW BIRTH WEIGHT BABIES BASED ON BIRTH WEIGHT, GESTATIONAL AGE , SEX AND INTRAUTERINE GROWTH- A SINGLE CENTRE RETROSPECTIVE COHORT ANALYSIS. By Rabindran et al
13. Bilateral Spontaneous Pneumothorax with Subcutaneous Emphysema. By Iraj Alam khan et al
14. Ectrodactyly in an infant of diabetic mother. By Uzma firdaus et al.
15. Neonatal Craniopharyngioma diagnosed antenatally. By Vaidehi Dande et al.
16. Risk factors for development of anemia of prematurity- A cohort study. By Amruta A Gokhale
17. A new syndrome of Microtia-Anotia with unilateral renal agenesis. Desai S et al.
18. Expanding spectrum of Acro-callosal syndrome: A case series. By Desai S et al.
19. RELATIONSHIP OF BODY WEIGHT GAIN AND THE DEVELOPMENT OF RETINOPATHY OF PREMATURETY IN EXTREMELY LOW BIRTH WEIGHT INFANTS. By Dr. Praveen Kr. Singh
20. Cardiac Troponin T (cTnT) in asphyxiated neonates admitted in a NICU. By Khushbu S Gangoli
21. Outcome of neonates admitted in a tertiary level neonatal unit. By Dr. Gunjan
22. Cord Nucleated RBC as a Marker of Perinatal Hypoxia in Newborn. By Anirudh Ghai,
23. PROSPECTIVE STUDY OF ACUTE RESPIRATORY DISTRESS IN NEWBORNS. By Pandey Mukul.

ORAL PAPER PRESENTATION

1. MRI improves prediction of neurodevelopmental outcomes in at-risk term neonates. By Dr. Pillai Anish
2. To compare the efficacy of HHHFNC and CPAP in post extubation period in VLBW neonates. By BHAWANDEEP GARG
3. Rate of decline in total serum bilirubin with double surface intensive phototherapy and fluid supplementation in severe unconjugated neonatal hyperbilirubinemia. By Dr Ashok Kumar Anuj
4. Combined approach (TSH and free T4 levels) for Newborn Screening: An Institutional Experience. By Gupta S
5. COMPARISON OF EFFICACY OF BRUFEN VERSUS INDOMETHACIN IN THE MEDICAL CLOSURE OF PATENT DUCTUS ARTERIOSUS. By LUGINA SINGH DUIA et al.

AWARD WINNING PAPER

Title Page - Title: Comparison of Nasal Intermittent Positive Pressure Ventilation versus Nasal Continuous Positive Airway Pressure as Post-Extubation Respiratory Support in Preterm Infants: A Randomized Controlled Trial.

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Short running title: NIPPV versus NCPAP: Post-extubation support in preterm infants.

Conflict of interest and source of funding: None

Site of the registry and the registration number: ctri.nic.in, CTRI/2014/01/004284

Abstract

Objective

To determine whether post extubation respiratory support via NIPPV decreases the need for mechanical ventilation (MV) compared to NCPAP in preterm infants.

Study Design: In this randomized, controlled, open, prospective, clinical trial we randomly assigned preterm ventilated infants to either NIPPV or NCPAP after extubation. The primary outcome was extubation failure within 72 hours after extubation.

Results

A total of 63 preterm ventilated infants were randomized to receive either NIPPV (n = 31) or NCPAP (n = 32). Extubation failure occurred in 6 (19.3%) of NIPPV group and 9 (28.12%) of NCPAP group but was statistically not significant (P = 0.55). The duration of non-invasive ventilation (NIV) was significantly lower in NIPPV group versus NCPAP group (40.35±39.34 hours versus 111.83±116.39 hours, P = 0.003). The duration of supplementary oxygen was significantly lower in NIPPV versus NCPAP group (84.86±92.05 hours versus 90.10±140.48 hours, P = 0.002). The rates of BPD in NIPPV group (2/29, 6.9%) were significantly lower than in NCPAP group (9/28, 32.14%) (P = 0.02).

Conclusion

NIPPV in comparison to NCPAP appears to be an equivalent mode of extubation in preterm infants with significant beneficial effects of reduced duration of NIV, supplementary oxygen and decreased rates of BPD.

Keywords: NIPPV, NCPAP, mechanical ventilation, non-invasive ventilation.

IAP NEOCON 2014

(November 1st-11nd, Meerut)





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Executive Editors :
Dr. Ranjan Kumar Pejaver
Dr. Rhishikesh Thakre

Managing Editors :
Dr. Naveen Bajaj
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