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DR NAVEEN PARKASH GUPTA

Cheif Editor, Neo Clips

Dear Friends,

Greetings from the NeoClips team. I hope you enjoyed the first issue of NeoClips.

We have some very interesting articles in this issue.

An interesting case of transient hyperammonemia is covered as a case report.

The review article "The Preterm Care Package, a Comprehensive Educational Module" is an initiative led by Prof. Ashok Deorari, which may well change the way basic Neonatology training is imparted all over the country.

Antenatal steroids are one of the most important interventions for decreasing preterm morbidity and improving preterm survival. Their role in low and middle-income countries has been recently evaluated in ACT 1 and 2 trials. We have covered both in the journal scan section.

The Neonatal Resuscitation Programme is a very important part of Neonatal training. This time we have covered it in OSCE section.

We hope that you will enjoy reading this issue. Our apologies for the delay which was due to circumstances beyond our control. Please share your feedback with us. It will help us improve the journal.

Dr Naveen Parkash Gupta

An Unusual Case of Transient Hyperammonemia in Neonate

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Case- A five day old term newborn presented to the Emergency with a history of lethargy,vomiting and multiple episodes of seizures. The baby was born to a second gravida mother with one previous live issue. The baby was delivered by LSCS. Parents were related, second degree consanguinity.

On examination the baby was stuporous, with a very minimal response to deep painful stimuli. Baby was ventilated and started on intravenous fluids. His blood gas and blood sugar was normal. He was started on phenobarbitone and then levitaracetam to control repeat episodes of multifocal clonic seizures. A sepsis screen, Serum Ammonia and TMS sample was sent. Sepsis screen was normal. Serum ammonia was 1800 micromol/l for which the child was started on oral sodium benzoate 250 mg/kg daily in four divided doses via NG.

On Day 3 of admission, he was hemodynamically stable, had good spontaneous respiratory efforts and his sensorium had improved. Serum ammonia was 32 micromol/L. He was noticed to have significant abdominal distension with minimal to small cloudy NG aspirates over the last 12 hrs and bowel sounds were absent. Xray abdomen was suggestive of massive pneumoperitoneum.

He was taken for laparotomy the same day with parental consent. Entire posterior wall of stomach was perforated with a 25 ml collection in lesser sac. However the rest of the gut was healthy. A transpyloric jejunal tube and a feeding jejunostomy was put in on day 7 of life(day 4 admission)

Over the period of next 2 weeks, jejunal feeds were progressively increased and the child was extubated on day 10 of life(day 7 admission. He developed an anastamotic leakage and wound infection on day 12 which were treated with culture guided iv antibiotics and parental nutrition with feed.

The TMS, GCMS report on Day 7 of life came back normal. Infant was discharged on Day 30 of life with healthy operative site, on full feeds by mouth and otherwise healthy sensorium with no antiepileptics with a diagnosis of " Transient hyperammonemia of Infancy with spontaneous posterior gastric perforation".

Discussion:

Hyperammonemia is a metabolic condition characterized by raised levels of ammonia, a nitrogen-containing compound. Normal values for ammonia concentration are often higher in newborns than in older children or adults. Mean plasma ammonia concentration of healthy term infants at birth is 45±9 micromol/L; the upper limit of normal is 80 to 90 micromol/L.

Primary genetic causes of hyperammonemia include urea cycle disorders (UCDs), organic acidemias, fatty acid oxidation defects, and disorders of pyruvate metabolism. Transient hyperammonemia of the newborn (THAN) is an unusual cause of hyperammonemia. Hyperammonemia most commonly presents with neurological manifestations and should be recognized early and treated immediately to prevent the development of life-threatening complications such as cerebral edema and brain herniation.In the neonatal period, hyperammonemia presents with non-specific signs and symptoms, and so sepsis, meningitis, intracranial hemorrhage, and GI bleed should be ruled out. Raised

levels of ammonia should prompt specific investigations including arterial blood gases, blood glucose, lactate and citrulline levels, plasma and urinary amino acids, urinary ketones, etc. Normal healthy term infants may have levels as high as upto100 micromoles/l [1]. If ammonia levels are more than 150 micromoles/l, complete evaluation should be done.

Transient hyperammoniemia is observed in some newborns,majority of them are premature and have mild respiratory distress.[2] Hyperammonemic coma may develop withon 2-3 days of life and infant may succumb to death if not treated immediately. Usually neonates with transient hyperammonemia do not suffer from long-term risk of hyperammonemia and can tolerate normal diet without drug therapy.

Spontaneous gastric perforation has been reported in term infants without apparent risk factors, but has also been variously seen in newborns with asphyxia, prematurity, necrotizing enterocolitis, and steroid usage.[3] We searched the database to find out the association of sodium benzoate (used in treatment of hyperammoniemia) with gastric perforation or hyperammoniemia with gastric perforation but couldn't find any association. Most common site is anterior wall of the stomach. Posterior wall and greater curvature are associated with worse prognosis.[4-6]

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Preterm care package: A comprehensive educational module

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(and developers of preterm care package*)

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Introduction

Globally, very few comprehensive packages exist for preterm and sick newborn care [1]. World Health Organisation also gives evidence based recommendations for interventions during pregnancy, labour and during the newborn period that are aimed at improving outcomes for preterm infants. There are operative guidelines for facility based newborn care, but focus of these guidelines is didactic learning and no separate skill training or assessment is included as a part of the package [2. 3].

Given the need, World Health Organization Collaborating Centre (WHO-CC) for Training and Research in Newborn Care, All India Institute of Medical Sciences (AIIMS), New Delhi along with Post Graduate Institute of Medical Education Research, Chandigarh and Government Medical College and Hospital, Chandigarh with the help of nearly thirty-fiveleaders in neonatology and nursing champions caring for preterm infants developed multimodal educational package with funding support from Queen Elizabeth Diamond Jubilee Trust (QEDJT) and administrative support through Public Health Foundation of India (PHFI).

Creation of preterm care package

The creation of the educational package included formative research for evaluating health facility readiness, and defining content deliverables and their layout. The modules in this package were then field tested and validated.

Each module has been organized with pre-defined learning objectives and deliverables including text, videos, webinars, posters and job aids (Panel 1: List of modules). A separate facilitator guide for the modules has also been simultaneously developed, which elaborates on the teaching methodology. Each learning objective has self-assessment at the time of completion through multiple choice questions. The modules deliver knowledge content and this is followed by skill learning. These skills are then evaluated by objective structured clinical examination (OSCE). Competency-based learning is then administered in small groups using low cost innovative models (simulation methodology). All the modules are available at https://www.newbornwhocc.org/Facility-Based-Care-of-Preterm-Infant.html.The printed version of the modules is packaged into two volumes with separate learner's (figure 1) and facilitator modules; the facilitator module outlines learning methodology with key tips for facilitator.

Teaching-learning methodology

This package uses latest pedagogy of blended learning. The package encompasses four key aspects which make it different from all other packages; first, is **knowledge domain** which covers content useful to the learner; second, the teaching learning methodology involves group discussions and imperative participation only as a team, experience sharing and interaction (thus mobilizing all potential learning channels) i.e. **affective domain** rather than didactic teaching; third, incorporation of quality improvement learning on day 1 helps teams prepare their context specific projects and fourth incorporation of skill and simulation (**psychomotor domain**) learning as a part of the workshop trainingthus building team approach, improving communication and performance. Although the concept appears simplistic, this education

methodology requires ongoing facilitator involvement.

The role of facilitator in this package is that of a mentor and guide rather than a teacher. In addition, the facilitator's role in not a one-time interaction, it is indeed ongoing. This initiates with the workshop module delivery and goes on to skill learning and simulation and thereafter ongoing facilitation for the quality improvement project and establishing local leadership in a particular unit for ongoing skill and simulation case runs. The facilitator is able to create a team and disseminate package at the local health facility while simultaneously embracing quality improvement.

The package focuses on the transformative learning strategies and the impact is likely to be revolutionary once it is taken to scale. In addition, the online web based learning platform along with its multimedia contents can be easily used for distance learning following which the participant can come for skill learning.

Web based platform

The entire content has been converted into a self-directed web based E-learning platform (www.pretermcare-eliminatingrop.com) designed to make users aware of the best care practices for preterm infants (figure 2). The user can start off with any module and do them in any sequence; however within a module each learning objective has to be completed in a systematic sequence. There is a timed self-assessment through multiple choice questionnaires at the end of each objective in a module and the user can go to the next objective if a minimum pass score is obtained in the given objective. The user has three attempts to pass each objective in a module.The online platform has an inbuilt system for scoring this self-assessment, and automatically generating completion certificates and keeping central records for completion.

Certain issues had to be kept in mind while designing the platform. The design of the website is intended to be minimalistic and easily navigable, to make the process easier for users who do not have as much experience with technology. The website was optimized for use with a weak internet connection, and materials were made available for offline download, so that users without a constant internet connection would not face issues. An FAQ section was also included to acquaint new users with the interface. A big advantage of a web-based approach is that these changes can be implemented swiftly, in tune with the user's demands.

Smartphone app

The educational package has been converted into Smartphone apps (available at AIIMS WHOCC PTC on google play and Preterm Care on IOS) and is available for free download.

Dissemination of package

This educational package was delivered to the target group by conducting workshops in different regions of the country. The overall model of the workshop is based on “train-the-trainer” to build the capacity of peer education trainers to deliver the same learning to their peer group once they return to the parent unit. The specific objectives include enabling participants to understand the basic concepts through participatory teaching learning methodology and clarify basic concepts in each specific module through group discussions and learn through skills- and simulation based education.

Our team conducted six workshops and these achieved many successes in 2018-19. We trained nearly 200 learners (figure 3), which translates into 100 teams from different SNCUs. The overall feedback on the workshop methodology has been promising and the participants felt empowered to utilize the knowledge and psychomotor skills for their own units. In the year 2020, our team conducted online course for best practices for preterm infants in two parts over three weekends each for nearly 400 participants. This virtual course included completion of modules on online platform (www.pretermcare-eliminatingrop.com) along with mandatory attendance and interaction with experts online. Telegram: a cross platform, free cloud based instant messaging software was used in 2021 in three

separate cohorts to train nurses and medical professionals in best practices for preterm care. Three E courses were conducted, using Telegram as the platform to share the resource materials. More than 5000 nurses and 700 doctors participated in thesecourses. In addition to easy access to package through mobile, the platform provided an opportunity for cross learning between the participants as well as the National facilitators, through live chats. Weekly live webinars were conducted to interact with the participants on the respective topic of the week. This novel method of online learning was well received during the pandemic, and has the potential for ongoing uses for dissemination of knowledge, followed by on site skill demonstrations at the regional health care centers. A recent study demonstrated rational oxygen use with implementation of preterm care package and quality improvement [6].Two studies (Chawla D et al and P Venugopal et al) evaluated the effectiveness of this educational package in increasing the knowledge and skills of participants and its effect on neonatal survival and morbidities in the SNCUs and are under publication.

The effect of the QI and preterm care package on morbidity and other clinical outcomes in preterm neonates i

Our expectations

The challenge hereon is twofold; first is to create master trainers and these master trainers train front line health care workers on an ongoing basis as teams, second is incorporation of QI as an integral part of the package training so as to ensure that evidence based best practices are translated into action.

Conclusion

The package focuses on the transformative learning strategies using adult learning principles and envisions adding value to professional development by making them skilled and competent medical professionals with philosophy of 'Do No Harm' to preterm babies

Acknowledgments

The authors are grateful to faculty from the National Neonatal Forum of India (NNF India) and the Indian Association of Neonatal Nurses (IANN) for endorsing the preterm package and app (available as PretermCare on iOS and as WHO CC PTC on Android). Both organizations were instrumental in nominating faculty and the enrolment of participants for the e-course. We also thank the Queen Elizabeth Diamond Jubilee Trust U.K. for supporting the development of the standardised package for preterm care for prevention of retinopathy of prematurity.

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Panel 1: Modules in the "preterm baby package"

1. Thermoregulation
2. Kangaroo mother care
3. Optimal oxygen administration
4. Less systemic infections
5. Optimal use of continuous positive airway pressure (CPAP)
6. Developmental supportive care and pain management
7. Good nutrition
8. Less use of blood products
9. Delivery room care and stabilization of a preterm infant
10. Follow up care pertaining to retinopathy of prematurity (ROP)

Figure 1: Learner's guide 1 and 2

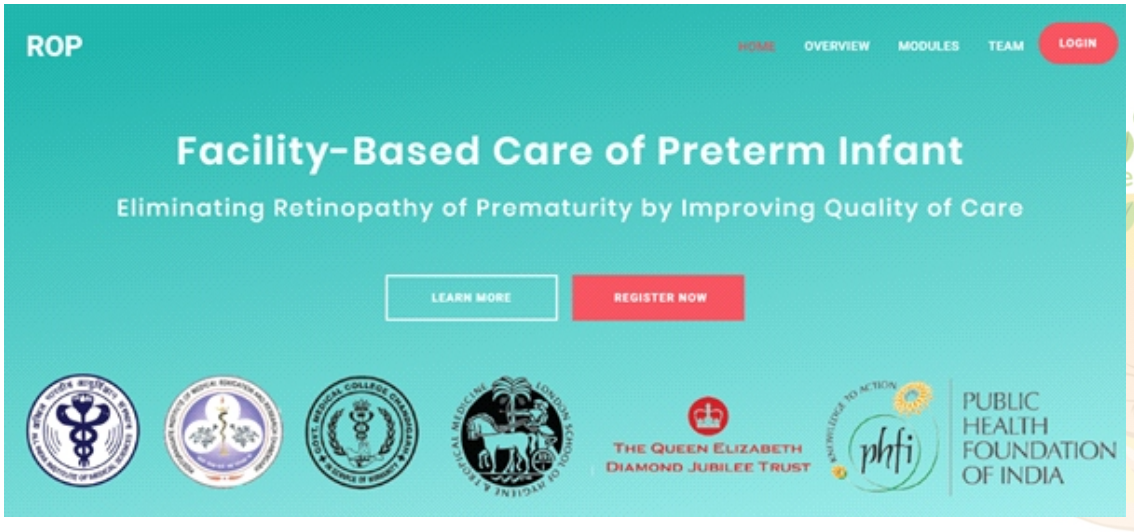

Figure 2: Web based platform (www.pretermcare-eliminatingrop.com)

Figure 3: Teams from medical colleges and institutions trained during dissemination workshops

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Neonatal Lupus with Rash and Thrombocytopenia

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Clinical Presentation - A preterm (32 weeks) appropriate for gestational age, female child with birth weight of 1600 grams born to primigravida mother presented presented on Day 2 of life with erythematous plaques over face, upper trunk, palms and soles. The plaques were associated with fine scaling. (Fig 2)

Relevant history - Mother had an erythematous maculopapular rash with scaling over soles in 3rd month of gestation which progressed to abdomen and thighs by 5th month of gestation. (Fig 1). Investigations revealed strongly positive (3+) ANA and Anti Ro. Anti dsDNA and anti-LA antibodies were negative. IgG and IgM for CMV were also positive. She was given emollients and topical steroids by a local doctor. She was not given any systemic steroids and was not investigated further.

Suspicion - ? Neonatal lupus ??TORCH infection

Investigations - She had asymptomatic thrombocytopenia (Initial platelet counts 55,000/mm3). She had positive ANA & Anti Ro antibodies. However, a workup for TORCH infections was negative (IgM Rubella & CMV negative, CMV DNA PCR negative). ECG and echocardiography was normal.

Treatment - Intravenous immunoglobulin was given (2 doses of 1 gm/kg each 24 hours apart). She was discharged on day 8 of life. Platelet counts improved gradually (PC 73,000 on Day 20 of life). She was treated with topical steroids for the rashes following which there was a significant improvement.

Condition - Neonatal lupus (NL) is a passively acquired autoimmune disease that occurs in offspring of mothers with anti-Ro/SSA (Sjögren syndrome type A antigen) and/or anti-La/SSB (Sjögren syndrome type B antigen) antibodies. It can have cutaneous, cardiac, hepatobiliary and haematological involvement. There is approximately 2% risk of complete heart block in child in first pregnancy. (1). Most of the manifestations, except cardiac, are self-resolving and improve as maternal antibodies clear. Thrombocytopenia, if severe, can be life-threatening and should be treated (2). Topical steroids may hasten the resolution of skin rash.

Key messages – Neonatal lupus is a multi-system disease. When suspected, a neonate should be investigated for possible involvement of cutaneous, cardiac, hepatobiliary and haematological systems.

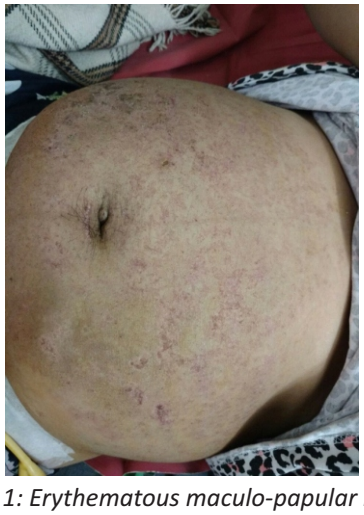

Figure 1: Erythematous maculo-papular rash in the mother in 5th month of pregnancy

Figure 2: Erythematous papulo-plaques with scaling

Image Section

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Clinical Presentation: Term, 38 weeks appropriate for gestational age, male baby who had an antenatal history of bilateral hydronephrosis with an anteroposterior diameter (APD) of the renal pelvis 42 and 38 mm on right and left side respectively at 36 weeks; was delivered vaginally. The baby did not require resuscitation and was shifted to NICU for further evaluation.

Suspicion: Posterior Urethral valve, B/L Pelvi-ureteric (PU) junction obstruction, Neurogenic bladder, B/L Vesicoureteral reflux (VUR).

Supporting investigations: USG KUB on day 3 showed B/L Hydronephrosis with APD of 21mm on right and 39 mm on the left side. Ureters were not visualized and the bladder wall was normal. Ethylene Dicysteine (EC) scan (Fig 1) showed an obstructive pattern left > right with the differential function of 36% on the left side and 60% on right. Repeat USG on day 8- APD of 12 mm on right and 44 mm on left. MCU showed normal posterior urethra and no VUR. A diagnosis of B/L PUJ obstruction was made, and surgical intervention was planned for the left side.

Indication for surgery: Increasing grades of severe hydronephrosis (APD >30mm) Split kidney function < 40%

Surgical intervention: Pyeloplasty was done on the left side on day 13 of life and a double J stent (Fig 2) was inserted at the PU junction till the bladder to allow healing and avoid fibrotic adhesion of the pelvis and ureter. Post-operative day 2, it got displaced distally and was later manipulated under cystoscopy to the appropriate position. Per urethral catheter was removed on postoperative day 3. A normal urinary stream was ensured. Renal functions monitored were normal and the baby was discharged on day 16 of life. The plan is to remove double J stent after 6 weeks postoperatively.

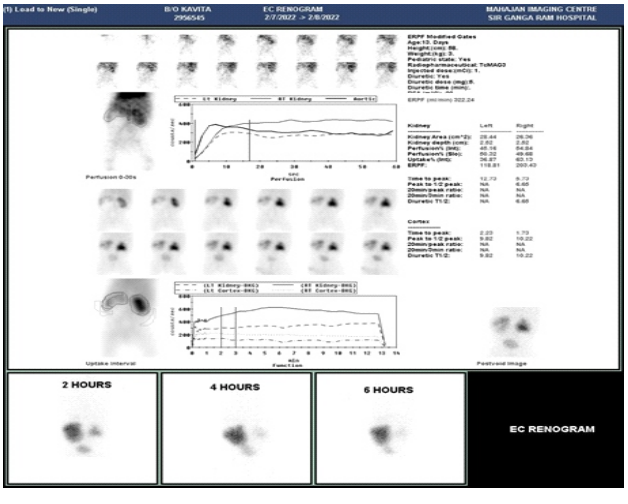

Fig 1: EC scan showing accumulation of dye in the left renal pelvis at 6 hours with narrowing at Pelvi-ureteric junction. The split kidney function of 36% on the left side and 60% on the right side

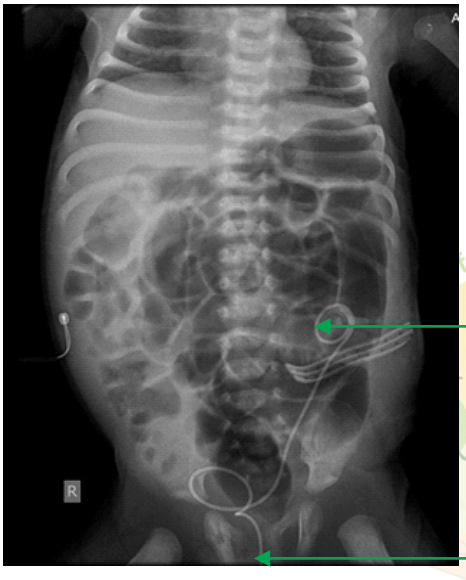

Fig 2: Postoperative X-ray showing D-J stent in situ post pyeloplasty and per-urethral catheter.

Journal Scan – Action 1 and Action 2 trials Role of Antenatal Steroids in LMICs

PURPOSE OF ACTION TRIALS

The safety and efficacy of antenatal glucocorticoids in women in low-resource countries who are at risk for preterm birth are uncertain. On the basis of trials conducted largely in high-resource countries, antenatal glucocorticoids have long been promoted as the key intervention for reducing preterm infant mortality and morbidity.[1,2] However, the generalizability of this evidence to low-resource settings was called into question in 2015, when a large population-based trial conducted in six low-resource countries showed that efforts to scale up the use of antenatal glucocorticoids could lead to harm in the form of increased neonatal death, still birth and maternal infection.[3] Because of the above mentioned considerations, in 2015 the World Health Organization (WHO) recommended that antenatal glucocorticoids should be used only under certain conditions, including the accurate assessment of gestational age, imminent preterm birth, the absence of maternal infection, and adequate care for childbirth and preterm newborns. The expert panel by the WHO conducted these efficacy trials (ACTION I and ACTION II) in hospitals in low-resource countries as a research priority.

ACTION I

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Antenatal Dexamethasone for Early Preterm Birth in Low-Resource Countries

NEJM 2020;383:2514-25.

The WHO ACTION Trials Collaborators

Population	Pregnant women with confirmed live fetuses between 26 weeks 0 days and 33 weeks 6 days of gestation, and at risk for preterm birth planned or expected in the next 48 hours.
Intervention	Dexamethasone group: Dexamethasone intramuscular injections 6mg every 12 hours for 4 doses
Control	Placebo
Outcome	Neonatal death (death of a live-born infant within 28 completed days of life) Stillbirth (death of a fetus post randomization) or neonatal death Composite of possible maternal bacterial infection (maternal fever- temperature ≥38 degrees C, or clinically suspected or confirmed infection for which therapeutic antibiotics were used

Design: Prospective multinational, multicentre, parallel-group, double-blind, individually randomized, placebo-controlled trial

Follow-up period: follow up of the women was conducted until 28 days after they gave birth or until death (whichever occurred first), and follow up of the fetuses occurred until 28 days after birth or until death (whichever occurred first).

Setting: 29 secondary and teritiary level hospitals across six trial sites in five countries (Bangladesh, India, Kenya, Nigeria -2 sites, and Pakistan).

Analysis and Sample Size:

Sample size was determined on the basis of neonatal death as the primary outcome targeting a decrease of 15% or more in a two sided 5% significance test with 90% power and accounting for 10% loss to follow up. A recruitment of 6018 women was estimated to be the sample size.

RESULTS

A total of 1416 women, and 1532 fetuses and infants were assessed for the primary outcomes in the dexamethasone group. A total of 1412 women, and 1519 fetuses and infants were assessed for primary outcomes in the control group.

Primary outcome: The incidence of neonatal death was significantly lower in the dexamethasone group compared to the placebo group (19.6% vs 23.5%; RR 0.84; 95% confidence interval [CI], 0.72 to 0.97; P=0.03).

The incidence of stillbirth or neonatal death was also significantly lower in the dexamethasone group compared to the placebo group (25.7% vs 29.2; RR 0.88; 95% CI 0.78 to 0.99, P=0.04).

Possible maternal bacterial infection was not higher in the dexamethasone group compared to the placebo group (4.8% vs 6.3%; RR 0.76; 95% CI 0.56 to 1.03; P=0.002 for non-inferiority).

Secondary outcome: The incidence of early neonatal death, severe respiratory distress syndrome 24 hours after birth, neonatal hypoglycemia 6 hours after birth, the use of CPAP, and the duration of oxygen therapy were all significantly lower in the dexamethasone group compared to the placebo group.

CONCLUSION

Antenatal dexamethasone for women at risk for imminent preterm birth in low resource settings significantly reduces the risks of neonatal death, and stillbirth or neonatal death, without increased harm to women or newborns.

Strengths of this study include the size, randomization, blinding, and multi-national. The study was designed to identify and recruit patients and fetuses who would potentially receive the most benefit from ANC.

Limitation of study was lack of uniformity in maternal and neonatal care practices across trial sites and use of ultrasonographic examination to assess gestational age for a substantial percentage of participants in the third trimester.

ACTION - II

Articles

Antenatal dexamethasone for late preterm birth: A multi-centre, two-arm, parallel, double-blind, placebo-controlled, randomized trial

WHO ACTION Trials Collaborators*

Vol 44 Month February, 2022

Population	Pregnant women with confirmed live fetuses between 34 weeks 0 days and 36 weeks 0 days of gestation, and at risk for preterm birth planned or expected in the next 48 hours.
Intervention	Dexamethasone group: Dexamethasone intramuscular injections 6mg every 12 hours for 4 doses
Control	Placebo
Outcome	Neonatal death (death of a live-born infant within 28 completed days of life) Stillbirth (death of a fetus post randomization) or neonatal death Possible maternal bacterial infection Severe respiratory distress

Design: Prospective multinational, multicentre, parallel-group, double-blind, individually randomized, placebo-controlled trial

Follow-up period: follow up of the women was conducted until 28 days after they gave birth or until death (whichever occurred first), and follow up of the fetuses occurred until 28 days after birth or until death (whichever occurred first).

Setting: This trial was planned to run concurrently with ACTION-I (early preterm) trial across all sites. However, as a result of several logistical challenges encountered with concurrent set up of two trials, only the four hospitals at the India site (in two different states) recruited into the ACTION-II trial

Analysis and Sample Size:

Based on a superiority hypothesis, a total of 22,589 women were needed to detect a reduction of 15% or more in neonatal deaths (from 8.0% deaths to 6.8%) amongst neonates of women who received ACS at 34 to 36 weeks, in a two-sided 5% significance test with 90% power, including 10% loss to follow-up.

Results

Of the 1198 women who were screened for eligibility, 782 women were randomized - 391 women and their 417 babies to the dexamethasone group, and 391 women and their 432 babies to the placebo group

Neonatal Death: 2.7% vs 2.8% (RR 0.95; 95% CI 0.42-2.12)

Severe respiratory distress 0.8% vs 0.5% (RR 1.56; 95% CI 0.26-9.29)

Maternal bacterial infection 2.3% vs 3.8% (RR 0.60; 95% CI 0.27-1.35)

The trial was stopped due to lower than expected prevalence of primary outcomes and slow recruitment.

Conclusions

Antenatal dexamethasone did not result in a reduction in neonatal death, stillbirth or neonatal death, or severe neonatal respiratory distress in this trial. The overall trend of effects suggests that potential benefit of dexamethasone in late preterm cannot be excluded, and further trials are required.

REVIEWER'S COMMENTS

ACTION I

Antenatal corticosteroids (ANC) improve survival and decrease morbidity in premature infant. However, their use has been controversial in low resource countries (LMICs) due to the ACT study which questioned the safety and efficacy of ANC. The ACT study had limitations; it did not collect or process data on the use of co-interventions affecting outcomes thus confounding the results. To answer the question better, Oladapo et al., the WHO ACTION collaborators, designed a multi-country randomized control blinded study. This study found significant reduction in neonatal death and stillbirth and death with the use of antenatal dexamethasone without increasing maternal morbidity or mortality.

This study reaffirms that dexamethasone is safe, efficacious, and a cost saving intervention for limited resource countries to reduce their hospital based stillbirth or neonatal mortality in premature infants. Dexamethasone has the potential to make a major impact for the survival of premature newborns in LRC when used with the appropriate clinical protocolized approach.

ACTION II

Evidence on the safety and efficacy of antenatal corticosteroids in preventing mortality and severe morbidity amongst late preterm newborns in low-resource countries was limited before this trial. The Antenatal Late Preterm Steroid (ALPS) trial was published in 2016,[5] reporting that intramuscular (IM) betamethasone administered to women at risk of late preterm birth significantly reduced a composite newborn outcome of respiratory morbidity treatment, stillbirth or neonatal death in the first 72 h after birth. ALPS was conducted in tertiary hospitals in the USA where there was a high level of care available for preterm infants and their mothers. While ALPS has led to updated recommendations in favour of late preterm ACS use in some high-resource countries, no efficacy trials have evaluated the use of ACS to support policy change for late preterm births in low-resource countries. Despite this, observational evidence suggests that ACS is used variably in late preterm period in LMICs. This trial did not detect reductions in neonatal death or severe respiratory distress, they identified a reduction in neonatal resuscitation at birth for newborns, and there was no evidence of difference between groups for neonatal hypoglycemia. The possibility of clinical benefits cannot yet be excluded and further efficacy trials in low-resource countries are required.

Suggested readings

1. Roberts D, Brown J, Medley N, Dalziel SR. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. Cochrane Database Syst Rev 2017; 3: CD004454.
2. Ballard PL, Ballard RA. Scientific basis and therapeutic regimens for use of antenatal glucocorticoids. Am J Obstet Gynecol 1995; 173: 254-62.
3. Althabe F, Belizan JM, McClure EM, et al. A population-based, multifaceted strategy to implement antenatal corticosteroid treatment versus standard care for the reduction of neonatal mortality due to preterm birth in low-income and middleincome countries: the ACT cluster-randomised trial. Lancet 2015; 385: 629-39.**7.** Vogel JP, Oladapo OT, Pileggi-Castro
4. WHO recommendations on interventions to improve preterm birth outcomes. Geneva: World Health Organization 2015.
5. Gyamfi-Bannerman C, Thom EA, Blackwell SC, et al. Antenatal betamethasone for women at risk for late preterm delivery. N Eng J Med. 2016;374(14):1311–1320.

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Question 1

You have been called in the labor room to attend a term delivery; you have already done the preparation for birth. You receive baby in prewarmed linen and deliver baby on mother's abdomen. Baby is not crying.

a) How will you proceed?

b) What are initial steps?

c) After initial steps baby is having laboured breathing. What will you do?

Question 2.

You have been called to attend delivery of a term baby. Baby is born limp. You have provided warmth, dried, stimulated, positioned the head and neck, and cleared the airway of secretions. It is now 60 seconds after birth and the baby is still apneic and limp.

a) What is your next action?

b) What concentration of oxygen will you use to start positive-pressure ventilation in this baby?

c) What ventilation rate should be used during positive pressure ventilation?

d) How much pressure should be used to start positive pressure ventilation?

e) How do you evaluate the baby's response to positive pressure ventilation?

Question 3.

You have been called to attend delivery of term baby. Baby didn't cry after birth, you provide initial steps. After initial steps baby is apneic and his heart rate is 80 beats/min. You start positive pressure ventilation with room air. After 15 seconds, heart rate is 60 beats/min and chest is not rising.

a) What will you do next?

b) The baby required prolonged bag and mask ventilation and you decide to insert OG tube to deflate the stomach. How would you measure the length to be inserted?

c) You decide to intubate this baby and capnography is available at your centre. What change in colour of CO_2 detector would suggest inflation and aeration of the lungs appropriately?

d) The baby had micrognathia and intubation attempts are unsuccessful. You decide to insert a laryngeal mask airway. Up to what landmark would you insert the laryngeal mask into the baby's mouth?

Question 4.

a) Identify the equipment shown in Fig 1.

b) Identify the parts labelled in Fig 1.

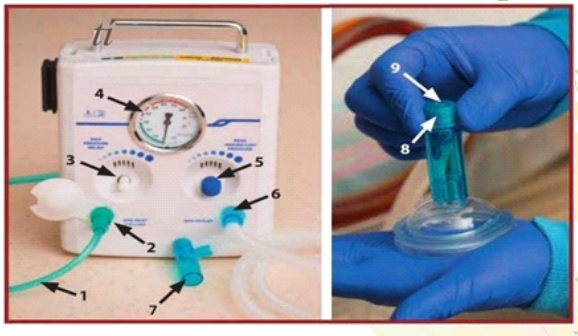

Fig 1

Question 5.

Your team is called to attend the birth for a woman at 36 weeks' gestation whose pregnancy and labor are complicated by preeclampsia, intrauterine growth restriction, and a Category II fetal heart rate pattern. The amniotic fluid is clear. After birth, the obstetrician dries and stimulates the baby, but the baby remains limp and apnoeic. The umbilical cord is clamped and cut, and the baby is moved to the radiant warmer. You finish drying the baby, provide brief additional stimulation, and position and clear secretions from the airway, but the baby is still not breathing. Within 1 minute of birth, you start positive-pressure ventilation (PPV) with 21 % oxygen. After 15 seconds, the heart rate is not increasing, and chest is not moving. You initiate the ventilation corrective steps, but baby is not improving, and you decide to intubate the baby. Baby's weight is around 2.2 kg.

a) Identify the important anatomic landmarks in the neonatal airway as shown in Fig. 2.

b) What are the indications for endotracheal intubation other than being an alternative airway?

c) What endotracheal size tube size would you use in this baby & how would you estimate the depth of insertion?

d) Within how much time should you complete the endotracheal intubation procedure?

e) Baby's condition worsens after endotracheal intubation. What could be the 4 possible causes?

f) You have inserted a laryngoscope and are attempting intubation. You see the view depicted in Fig. 3. What action would you take to visualize the glottis?

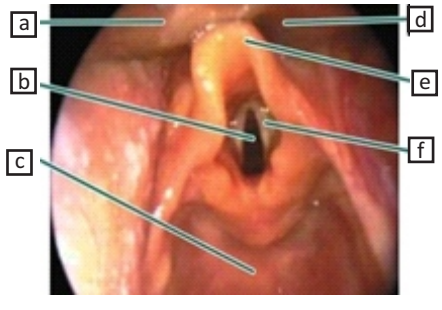

Fig 2

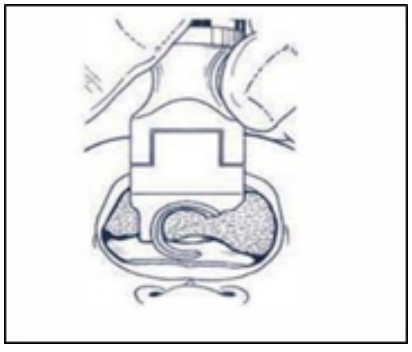

Fig 3

Question 6.

A newborn is apnoeic at birth. The baby does not improve with the initial steps and positive-pressure ventilation. An endotracheal tube is inserted, and chest is moving well. After 30 seconds of effective PPV, the heart rate is remaining 40 beats per minute.

a) What will be your next step?

b) Mark the area on the baby shown in Fig 4, where you would apply chest compressions.

c) What is the correct depth of chest compressions?

d) What important things should you consider when starting chest compressions?

e) After how much time would you assess the baby's heart rate response once you have started chest compressions?

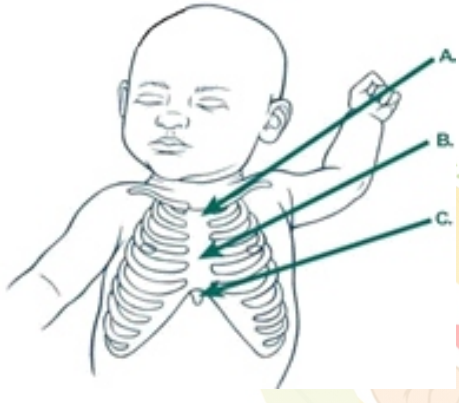

Fig 4

Question 7.

You are called to attend delivery of a term baby with maternal history of abruptio placentae. Baby is born limp and pale. During resuscitation, you've established adequate ventilation with an endotracheal tube and your colleague has begun chest compressions for a heart rate 40 bpm. Nevertheless, after 60 seconds, the heart rate has not increased.

a) What is the most appropriate next step in management?

b) What is the recommended concentration of epinephrine for newborns?

c) What is the suggested initial intravenous dose of epinephrine?

d) How do you administer intravenous epinephrine? What amount of saline do you use for flushing?

e) If the baby's heart rate remains less than 60 beats per minute, you can repeat the dose of epinephrine every _____ minutes.

f) Even after epinephrine, baby remains pale, heart rate is not improving, and peripheries are cold and clammy. What will be your next step?

Question 8.

You have turned on the radiant warmer in anticipation of the birth of a baby at 27 weeks' gestation.

a) List 4 additional steps that will help maintain this baby's temperature.

b) After initial steps baby needs positive pressure ventilation. What is preferred device to provide positive pressure ventilation in this baby?

c) What Fio2 will you use to initiate PPV?

d) What should be the position of baby's leg as compared to head to decrease neurologic injury in a premature newborn during and after resuscitation?

Question 9.

Miscellaneous scenarios

a) A newborn has respiratory distress after birth. The baby has small jaw, glossoptosis and cleft palate. What will you do in the delivery room to manage respiratory distress in this baby?

b) How would you position a baby with meningomyelocele in the delivery room and later? What type of gloves would you specifically prefer during resuscitation of this baby?

c) You have gone to attend the delivery of a neonate with gastroschisis. How would you position this baby in the delivery room? At what length would you cut the umbilical cord in this baby?

d) You attend birth of a baby with antenatally diagnosed congenital diaphragmatic hernia. Baby is born limp. What will be your next step promptly after birth?

Question 10.

You have been called to attend the delivery of 33 years old primi mother at term gestation. Baby is born limp. This mother had history of reduced foetal movements throughout pregnancy and had amniotic fluid index of 35. There is no history of sentinel event prior to delivery. The mother had not received any opiates. Baby is born limp, has short umbilical cord and undescended testis. Heart rate and spo2 promptly improve after PPV but baby does not breathe spontaneously.

a) What is the possible diagnosis in this baby?

b) What are the other possible causes of poor respiratory drive in neonates at birth, when there is no history of sentinel event?

c) What will be your priority management in a baby if mother had received opiate shortly before birth?

d) What is the current state of evidence regarding use of Naloxone in such babies and what are few complications reported with use of Naloxone?

Question 11.

A woman is admitted to the hospital at 23 weeks gestation with contractions, fever, fetal tachycardia, and ruptured membranes leaking purulent amniotic fluid.

a) What important points you would include while counselling the parents in this case?

b) What role should parents play in decisions about resuscitation?

c) What ethical principles apply to neonatal resuscitation?

Answer 1.

a. Immediate clamping of cord, take baby to radiant warmer and start initial steps.

b. Provide warmth, dry, stimulate, position, clear the airway if needed.

c. Put pulseoximeter on right hand, suction again (if needed) and start CPAP

Answer 2.

a) Start PPV

b) 21%. For the initial resuscitation of newborns greater than or equal to 35 weeks' gestation, set the blender to 21 % oxygen. For the initial resuscitation of newborns less than 35 weeks gestation, set the blender to 21 % to 30% oxygen. Set the flowmeter to 10 L/minute

c) 40- 60 breaths per minute

d) Start with a PIP of 20 to 25 cm H20. When PEEP is also being used, the suggested initial setting for PEEP is 5 cm H20.

e) The most important indicator of successful PPV is a rising heart rate.

If the baby's heart rate is increasing after the first 15 seconds, continue PPV and check the response again after total 30 seconds of PPV.

If the baby's heart rate is not increasing after the first 15 seconds, ask the assistant if the chest is moving.

- If the chest is moving, continue PPV while you monitor your ventilation technique. Check the baby's response again after 30 seconds of PPV.
- If the chest is NOT moving, you may not be ventilating the baby's lungs. Perform the ventilation corrective steps until you achieve chest movement with PPV.

Answer 3.

a. Ventilation corrective steps (MR. SOPA).

- Mask adjustment
- Reposition the head and neck

Gives 5 breaths and asks assistant to assess chest movement

"No chest movement."

- Suction the mouth and nose
- Open the mouth

Gives 5 breaths and asks assistant to assess chest movement

"No chest movement."

- Increases Pressure by 5 to 10 cm H20 increments to maximum 40 cm H20 for term baby

Gives 5 breaths and asks assistant to assess chest movement

- Intubate

Gives 5 breaths and asks assistant to assess chest movement

b. Distance from bridge of the nose to the earlobe and from the earlobe to a point halfway between the xiphoid process and the umbilicus.

c. CO2 detector turns yellow.

d. A laryngeal mask is inserted into the baby's mouth and advanced into the throat until it makes a seal over the entrance to the baby's trachea.

Answer 4.

a) T-piece resuscitator

1. Gas tubing

2. Gas inlet

3. Maximum pressure-relief control
4. Manometer
5. Inflation pressure control
6. Gas outlet (proximal)
7. T-piece gas outlet (patient)
8. T-piece PEEP adjustment dial
9. Opening on T-piece cap which is occluded for providing PIP

Answer 5.

a)

a. Tongue

b. Glottis

c. Esophagus

d. Vallecula

e. Epiglottis

f. Vocal cords

b) Indications for endotracheal intubation: As an alternative airway; Before starting chest compressions; Diaphragmatic hernia; For administering medications

c) 3.5 size ET in this baby. Depth of insertion: NTL (Nasotragal length + 1 cm)

d) 30 seconds

e) Displacement, Obstruction, Pneumothorax, Equipment failure

f) Advance the laryngoscope forward to visualise the glottis.

Answer 6.

a) Start chest compressions coordinated with PPV.

b) B

c) One-third of AP diameter of chest

d) Intubation has been done; 100% Fio2; ECG leads placement if available and call for additional help.

e) 60 seconds

Answer 7.

a) Administer epinephrine.

b) The recommended concentration of epinephrine for newborns is 0.1 mg/mL.

c) The suggested intravenous dose of epinephrine is 0.02 mg/kg (0.2 ml/kg of 1:10000 solution).

d) Intravenous epinephrine should be administered as quickly as possible, followed by a 3-mL normal saline flush.

e) If the baby's heart rate remains less than 60 beats per minute, you can repeat the dose of epinephrine every 3 to 5 minutes.

f) Administer Normal saline or O negative packed red blood cells if available. The initial dose is 10 mL/kg.

Answer 8.

a) Increase the room temperature to 23ºC to 25°C (74°F to77ºF), prepare a thermal mattress, prepare a polyethene plastic bag or wrap, and pre-warm a transport incubator if the baby will be moved after birth.

b) T- piece resuscitator/ a PPV device that can deliver both PIP and PEEP

c) 21-30%

d) Avoid placing baby's legs higher than the head.

Answer 9.

b) Baby's respiratory distress may improve by inserting a small endotracheal tube in the nose, advancing it to the pharynx (nasopharyngeal airway), and placing the baby prone.

c) Babies with MMC should be placed prone or side-lying. Latex free gloves as babies with NTDs may have latex allergy.

d) Babies with gastroschisis should be positioned on their right side. The umbilical cord should be clamped and cut 10-20 cm from the baby

because the cord may be used as a part of surgical repair.

Answer 10.

a) Neuromuscular disorder

b) Other causes of poor respiratory drive in absence of sentinel event:

Opiate administration before birth, general anesthesia, medications like narcotics self-administered by mother, Structural brain abnormality, severe sepsis/ meningitis leading to hypoxia and acidosis.

c) PPV

d) There is insufficient evidence to evaluate safety and efficacy of this drug. Very little is known about the pharmacology of naloxone in the newborn. Animal studies and case reports have raised concerns about complications from naloxone, including pulmonary edema, cardiac arrest, and seizures.

Answer 11.

a) We would review and include current national and local data describing the anticipated short- and long-term outcomes at this extremely early gestation. The parents should be provided information and explained the treatment options. The parents should be informed that some parents might decide that attempting resuscitation and life-sustaining medical treatment is not in their baby's best interest in view of the high risk of mortality and morbidity and might, instead, choose palliative care focusing on the baby's comfort after birth, while others may support full life support. Shared decision making would be done.

b) Generally, parents are the best surrogate decision makers for their own babies, and they should be involved in shared decision-making whenever possible.

c) Ethical principles that apply to all medical care, including neonatal care, include respecting an individual's rights to make choices that affect their life *(autonomy),* acting to benefit others *(beneficence),* avoiding harm *(nonmaleficence),* and treating people truthfully and fairly *(justice).*

Instructions for Authors

Review Article	**The article should be approximately 2-3 pages long with a word count of 2000-2500 words. Author should summarize key practice points at the end. Please include 5-6 references as suggested reading.**
Case Report	**This would be a summary of the case discussed in that months clinical meeting. Interesting cases even if not presented may also be submitted. It should include the clinical presentation and a brief discussion about the condition. Word count should be 1000-1500. Please include 2-3 references at the end.**
Journal Scan	**Some recent research paper of interest to pediatricians and neonatologists. The structure should include Introduction, Research question, Hypothesis, Methods, Results, Limitations and strengths of study, Reviewers comments. Word count should be approximately 1000 words. Please include 2-3 references if needed at the end.**
Picture of Month	**An interesting case related to neonatal practice. It should have a brief case history and a commentary, all fitting on one page along with the pictures.**
Image section	**Any interesting Xray, Ultrasound, CT or MRI of clinical interest. Brief clinical presentation and about the condition should be summarized on one page along with image.**
OSCE	**About 10-12 questions would be included in this section along with answers.**

Contact Us

On behalf of committee, I request all members of NNF, Delhi to actively contribute to various sections of the newsletter.

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