

Selected Abstracts of the 3rd Edition of Transport of High Risk Infants

**WHEN SKILLS, EQUIPMENT AND PROFESSIONALISM
MAKE THE DIFFERENCE**

OXFORD (UK) • AUGUST 31ST-SEPTEMBER 2ND, 2017

The Congress has been organized by the International Federation of Acute Neonatal Transport Services (INFANTS).

INFANTS EXECUTIVE COMMITTEE

Morten Breindahl (Sweden), Susan Broster (UK), William Cyr (USA), Neelam Gupta (UK), Boubou Hallberg (Sweden), Michael Meyer (USA), Luca Ramenghi (Italy), Stephanie Redpath (Canada), Michael Stewart (Australia), Marta Thio Lluch (Australia)



Organizing secretariat



HOW TO CITE

[Abstract's authors]. [Abstract's title]. In: Selected Abstracts of the 3rd Edition of Transport of High Risk Infants; Oxford (UK); August 31st-September 2nd, 2017. J Pediatr Neonat Individual Med. 2017;6(2):e060214. doi: 10.7363/060214.

Clinical**ABS 1****MORTALITY RATE IN 23-30 WEEKS PREMATURE BORN IN LEVEL 2 HOSPITAL IN COMPARISON TO THOSE BORN IN TERTIARY-CARE HOSPITAL**

J.P. Doray, J.L. Doray

Pediatric Department, CISSS-ME, Hôpital Pierre Boucher, Longueuil, Québec, Canada

INTRODUCTION

It is well known that the mortality rate of a premature is higher if he is not born in a Level 3 Hospital. Attempts are always made to transfer pregnancies of less than 32 weeks of gestational age to a Level 3 Hospital. Unfortunately, for several reasons, this is sometimes impossible (for example: imminent delivery). We analyzed our data on the mortality rate of premature born before 31 weeks in our Level 2 Hospital during years 1998 to 2016.

MATERIALS AND METHODS

For years 1998 to 2016, we compared prospectively the mortality rate of premature born before 31 weeks in our Hospital and then transferred to a Level 3 Hospital with that of those born before 31 weeks whose mothers were initially transferred to a Level 3 Hospital.

RESULTS

Mortality rates from our Level 2 Hospital are respectively 18/22, 3/11 and 1/27 for prematures of

23-24 weeks, 25-26 weeks and 27-30 weeks. But when the prematures can be transferred to a Level 3 Center, the mortality rate goes down to 1/5, 2/10 and 0/26. They are similar to the ones born at a Level 3 Center from our transferred mother (4/17, 0/18 and 1/75 for 23-24, 25-26 and 27-30 weekers) (**Tab. 1**). Although it is recommended to transfer women who have less than 32 weeks of gestational age because of the high rate of neonatal mortality, we observed a similar rate in the mortality when the infants can be transferred to the Level 3 Hospital. The transportation doesn't play a role in the mortality rate of the prematures.

CONCLUSIONS

The mortality rate of premature born at our Level 2 Hospital is high. However when the prematures can be transferred to a Level 3 Hospital the mortality rate is the same as if they were born to the Level 3 Hospital.

ABS 2**THE QUEBEC AEROMEDICAL EXPERIENCE: EVACUATION OF NEONATES FROM AREAS IN EXTREME WEATHER CONDITIONS – INNOVATIONS IN SAFETY AND EFFICIENCY**

É. Notebaert, J. Provencher, R. Bernier, S. Côté, S. Kind

ÉVAQ: Programme National d'Evacuation Aéromédicale du Québec, Québec, Canada

INTRODUCTION

Our province covers an area of 1,667,926 km². Many infants born in cities and villages must be transferred to a NICU in Quebec and Montreal by the neonatal team using a jet (Challenger 301-3R). Last year, among these neonates, we transferred 54 premature infants (under 37 w gest.). In winter the temperature may reach minus 30°C. They are at high risk of hypothermia. Many newborns must firstly be evacuated from remote villages by small

Table 1 (ABS 1). Prematures and mortality rates (1998-2016).

	Total born at our Level 2 Hospital (deaths/total)	Deaths at our Level 2 Hospital before transportation (deaths/total)	Born at our Level 2 Hospital and transferred at a Level 3 Hospital (deaths/total)	Born at a Level 3 Hospital from our transferred mothers (deaths/total)	Transferred Level 2 prematures vs Level 3 born prematures (p-value)
23-24 wks	18/22	17/22	1/5	4/17	0.340
25-26 wks	3/11	1/11	2/10	0/18	0.340
27-30 wks	1/27	1/27	0/26	1/75	0.307

airplanes. We have to transfer them safely on a tarmac exposed to extreme weather and strong winds. In the jet, these babies may suffer from vibrations, gravitational stresses. Their metabolic system work is increased, they may suffer from internal and cerebral bleeding. Moreover, 22% were intubated with a risk of extubation or displacement of freezing catheters. In order to do a safe and fast transfer, we developed 2 new devices.

MATERIALS AND METHODS

To speed up and decrease the risk factors, all the hospitals in the province are getting equipped with the same type of incubator, and we are exchanging our empty incubator against the one with the patient. We developed a plate with a quick system that enables us to rapidly lock and unlock these incubators on the litters. The newborns are buckled in their incubator with a new system, called PITSI, that enables us to have a quick access to their umbilical cord and thorax for techniques. The mattress under the newborns is made of a memory foam. In order to decrease the stress on the brain, there is a rotation system that can elevate his/her head.

CONCLUSIONS

These new approaches appear to be safe, and we think they will contribute to a better outcome for these very fragile newborns. We plan to study the impact of these innovations in the future.

ABS 3

NASAL HIGH FLOW SUPPORT DURING NEONATAL RETRIEVAL IN VICTORIA, AUSTRALIA

V. Abraham¹, C. Roberts¹⁻⁵, B. Manley^{2,3}, L. Owen¹⁻³, M. Stewart^{1,2}, P. Davis^{2,3}

¹Pediatric Infant Perinatal Emergency Retrieval Service, The Royal Children's Hospital, Melbourne, Australia

²Newborn Research & Neonatal Services, The Royal Women's Hospital, Melbourne, Australia

³Department of Obstetrics & Gynaecology, The University of Melbourne, Melbourne, Australia

⁴Monash Newborn, Monash Children's Hospital, Melbourne, Australia

⁵Department of Pediatrics, Monash University, Melbourne, Australia

INTRODUCTION

The neonatal retrieval service in Victoria, Australia carries out approximately 1,200 emergency and 1,600 return transfers annually. Respiratory support is routinely provided using nasal continuous positive

airway pressure (CPAP), or mechanical ventilation (MV) via an endotracheal tube. Recently, nasal high flow (HF) has been increasingly used in neonatal and pediatric intensive care units. In 2014 a system to deliver HF during transport was introduced for neonatal and infant retrievals in Victoria, Australia.

MATERIALS AND METHODS

This prospective audit, designed at the time of introduction of HF into practice, was conducted from July 2014-December 2016. We collected data on type of transport (road or air), demographics and diagnoses of infants, and whether respiratory support was escalated during retrieval.

Data were collected using an audit form; either during transport, or after retrieval was complete. Telephone follow-up was performed within 72 hours of transfer for emergency retrievals.

RESULTS

There were 118 HF retrievals during the study period (7% of 1,684 respiratory support retrievals). Infant demographics and clinical information are shown in **Tab. 1**. Common reasons for transfer were bronchiolitis (49% of cases), suspected/confirmed cardiac anomaly (14%) and return transfer (9%).

Table 1 (ABS 3). Infant demographics and clinical information.

Birth gestation, weeks		37 (24-41)
Birth weight, grams		2,680 (420-4,840)
Transfer gestation, weeks		41 (27-55)
Transfer weight, grams		3,400 (859-6,200)
Transfer age, days		28 (0-178)
Male sex (%)		65%
Duration of transfer, hours		1.6 (0.6-7.3)
Mode of transfer	Road	88%
	Air fixed wing	12%
Type of transfer	Emergency	86%
	Elective	14%
Transfer distance, kms	Road	24 (1-320)
	Air fixed wing	262 (75-3,753)
Maximum set gas flow, L/min		8 (4-12)
Maximum fraction of inspired oxygen		0.29 (0.21-1.00)
Respiratory support at 24-72 hour follow-up	None	16%
	Low flow oxygen	12%
	HF	49%
	CPAP	13%
	NIPPV	1%
	MV	9%

Values are median (range) unless stated.

HF: high flow; CPAP: continuous positive airway pressure; NIPPV: nasal intermittent positive pressure ventilation; MV: mechanical ventilation.

Transfer of infants with respiratory distress syndrome or transient tachypnoea of the newborn on HF was rare (5% and 2% of cases). In 79% of cases the referring hospital applied HF prior to retrieval team arrival. In 114/118 cases transfer on HF was successful; retrieval teams changed 4 infants to CPAP at the referring hospital, due to clinical concerns. No pneumothoraces or equipment issues occurred during transport.

CONCLUSIONS

HF appears safe and well-tolerated when used in conjunction with formal guidelines during neonatal transport. HF transfers represented a small proportion of all respiratory support transfers. Retrieval services using HF should be capable of providing alternative respiratory support (CPAP and MV).

ABS 4

NEONATAL TRANSPORT TO AND FROM A REGIONAL LEVEL 2 CENTRE

C. Moore¹, M. Cassidy¹, M. Byrne¹, A. Bowden², J. Franta², I. Farombi¹, J. Fitzsimons¹

¹Neonatal Unit, Our Lady of Lourdes Hospital, Drogheda, Co Louth, Ireland

²National Neonatal Transport Programme, Rotunda Hospital, Dublin 1, Ireland

INTRODUCTION

Our regional level 2 neonatal unit manages approximately 3,000 births per year. We transfer babies for tertiary level care or specialist investigations and receive transfers back from other centres. The aims of this study were to quantify the number of babies transferred from and to our unit and to examine how many were performed by the National Neonatal Transport Programme (NNTP) service.

MATERIALS AND METHODS

Transfers to and from the Neonatal Unit were prospectively recorded over the calendar year 2016. The source or destination of the transport was recorded, as well as the reason for transfer. The use of the NNTP service was also recorded.

RESULTS

There was a total of 67 transfers to and from our unit. There were 39 transfers out, 11 (28%) to level 3 units, with 6 (55%) of these to our network level 3 unit. 33% (n = 13) of outbound transfers were to level 1 units, with 77% (n = 11) of transfers to our network level 1 unit. Tertiary paediatric hospitals accounted for another 33% (n = 13) of outbound transfers.

38% (n = 15) of outbound transfers were undertaken by the NNTP service.

There were 28 transfers into our unit. Transfers from level 3 neonatal units accounted for 86% (n = 25) of the transfers accepted, with 79% (n = 19) of these transfers from our in-network level 3 unit. The remaining transfers into our unit (14%) were from tertiary paediatric hospitals.

21% (n = 6) of the inbound transfers were completed by the NNTP.

16 babies also left the hospital on day transfers – 93% (n = 15) leaving for outpatient assessment in tertiary hospitals.

CONCLUSIONS

83 neonatal transfers were undertaken from our level 2 regional neonatal unit in 2016, with 62 undertaken with network nurses. This transport requirement has an impact on nursing staffing provision, and further supports calls for a national neonatal retro-transfer service.

ABS 5

PASSIVE THERAPEUTIC HYPOTHERMIA DURING AMBULANCE AND HELICOPTER SECONDARY NEONATAL TRANSPORT IN NEONATES WITH HYPOXIC BRAIN INJURY: 10-YEARS RETROSPECTIVE SURVEY

M. Leben¹, M. Noliml¹, I. Vidmar², S. Grosek^{2,3}

¹Medical Faculty, University Ljubljana, Ljubljana, Slovenia

²Department of Pediatric Surgery and Intensive Care, University Medical Centre Ljubljana, Ljubljana, Slovenia

³University Medical Centre Ljubljana and Department of Pediatrics, Medical Faculty, University Ljubljana, Ljubljana, Slovenia

INTRODUCTION

Perinatal therapeutic induced hypothermia is a recognized therapeutic method of treating mild to severe hypoxic-ischaemic encephalopathy with better neurocognitive outcomes if started within 6 hours after birth.

The objective was to evaluate the quality of the passive therapeutic cooling during secondary neonatal transport to an intensive care unit.

MATERIALS AND METHODS

A retrospective study was conducted on neonates, transported by helicopter or ambulance, who received therapeutic passive induced whole body hypothermia during neonatal secondary transport to the Department of Pediatric Surgery and Intensive Therapy, University Medical Centre Ljubljana

between 5th September 2006 and 24th December 2016. Incubators used for transportation were Dräger Transport Incubator 5300 and 5400, and KGaA and Neosave III TM Medcare Visions GMBH. Body temperature was measured axillary with Beurer GMBH type: FT15/I Express thermometer (Söflinger).

RESULTS

Fifty-nine out of sixty-eight transported newborns who met criteria for therapeutic induced hypothermia were included. The mean birth weight was 3,176 g (\pm 494 g) and gestation age was 275 days (\pm 11 days). The mean temperatures before and at the end of transport were 34.9°C and 33.7°C, respectively. At the end of transport, 20.3% of the newborns had temperature $<$ 33°C and 25.4% $>$ 34°C. A negative correlation between the duration of the transport and temperature at the end of transport was found (Pearson correlation coefficient = -0.282; p = 0.037). A positive correlation was found between the body temperature before and at the end of transport (Pearson correlation coefficient = 0.462; p = 0.001). The type of transport or gender differences did not affect any of the measured parameters. No correlations were found between the meteorological season of the transport and the body temperature.

CONCLUSIONS

Targeted axillary body temperature was achieved only in 54.3% of transported neonates with passive induced cooling. Longer duration of transport negatively correlates with temperature at the end of transport.

ABS 6

STABILIZATION OF CRITICALLY ILL NEWBORNS: PREVENTION OF ACUTE KIDNEY INJURY

A. Babintseva, Y. Hodovanets, L. Agafonova

Department of Pediatrics, Neonatology and Perinatal Medicine, Bukovinian State Medical University, Chernivtsi, Ukraine

INTRODUCTION

The stabilization of renal functions is one of the main targets before transportation of critically ill newborns. Experiments in animals have shown that renal adenosine acts as a vasoconstrictive metabolite in the kidney after hypoxemia and/or ischemia, contributing to the fall in glomerular filtration rate and filtration fraction. Vasoconstriction produced by adenosine can be inhibited by the nonspecific adenosine receptor antagonist – theophylline.

Objective: to study the efficacy of a single intravenous dose of theophylline 3 mg/kg in the first 60 minutes of life to form renal functions in critically ill full-term infants.

MATERIALS AND METHODS

We randomized 50 full-term infants at the end of the 1st and 5th day of their lives including 25 infants with clinical signs of severe perinatal pathology who in addition to basic therapy received theophylline and 25 infants with analogous condition who received general complex of treatment. Renal functions were evaluated on the basis of detection of urine output, body mass balance, levels of serum creatinine and urea, calculation of glomerular filtration rate, and Doppler metric rate characteristics on the major renal arteries.

RESULTS

Full-term infants with severe perinatal pathology represent a risk group to develop multi-system lesions, including renal dysfunctions. Administration of a single intravenous injection of theophylline (3 mg/kg) promotes effective stimulation of urine output (1.9 ± 2.7 ml/kg/h vs 2.7 ml/kg/h, $p < 0.05$) and body mass balance, is accompanied by decreased levels of creatinine (44.2 ± 2.02 μ mol/L vs 37.2 ± 1.19 μ mol/L, $p < 0.05$), and increased glomerular filtration rate (48.1 ± 2.49 ml/min/1.73m² vs 51.7 ± 2.71 ml/min/1.73m², $p < 0.05$), and positive changes of renal Doppler metric characteristics.

CONCLUSIONS

The authors consider it necessary to continue studying the efficacy of preventive theophylline administration for full-term infants with severe disorders of the early postnatal adaptation processes, involving larger cohort of patients with the aim to introduce the presented therapy.

ABS 7

TRANSPORT OF THE SURGICAL NEONATES

R. Pejaver¹, A. Poveidein¹, D. Winterbank-Scott¹, C. Keys², N. Gupta¹

¹Southampton Oxford Neonatal Transport, University Hospital Southampton NHS Trust, Southampton, UK

²Pediatric Surgery, University Hospital Southampton NHS Trust, Southampton, UK

INTRODUCTION

Neonatal surgical care is centralised to regional centres. Increasingly, congenital anomalies are

diagnosed antenatally (facilitating delivery of these newborns in these centres) but a small majority of newborns with surgical conditions require transfer. We assessed clinical and demographic profiles of the neonates referred and transferred for suspected surgical conditions.

MATERIALS AND METHODS

Demographic and clinical data for neonates referred for suspected neonatal surgical conditions to the regional surgical centres was collected between 1st July 2015 and 30th April 2017 (**Tab. 1**). All newborns were discussed with surgical clinicians prior to referral. All transfers conducted by the UHS Southampton Oxford Neonatal Transport (SONeT) service were included in this study.

RESULTS

During the study period, 590 unplanned transfers included 198 (34%) infants with suspected surgical conditions. The median gestation at transfer was 40 (26-46) weeks and 80% were referred in the first week of life. 14% required retrieval within 1 hour (time critical) and 77% within 6 hours. At transfer, 27% were “ITU” and 31% “HDU” Wincare level. 18% were invasively ventilated though the majority (79%) did not require respiratory support. 40% had a surgical diagnosis confirmed after transfer. Neonates with bilious vomiting led to the majority of transfers, but fewer confirmed surgical diagnoses. After excluding bilious vomiting, the percentage of confirmed surgical conditions in transferred neonates was 68%, the majority for

Table 1 (ABS 7). Distribution of surgical conditions in neonates transferred by UHS Southampton Oxford Neonatal Transport (SONeT).

Suspected pathology/signs at referral	Newborns n = 198	Newborns with confirmed surgical pathology requiring intervention n = 77 (39%)
Malrotation/volvulus of gut with bilious vomiting presentation	106	9 (8.5%) 4 Malrotation 2 Hirschsprung disease 1 Duodenal atresia 1 Surgical NEC 1 Annular pancreas
Bowel obstruction	22	14 (63%) 3 Hirschsprung disease 3 Meconium ileus 3 Duodenal atresia 1 Cecal perforation 1 Ileal atresia 2 Pyloric stenosis 1 Medical NEC
Intestinal perforation	9	7 (78%) 6 Intestinal perforation (2 spontaneous, 1 antenatal, 3 NEC) 1 Milk curd obstruction
Surgical NEC	26	14 (53%) 12 Surgical NEC (2 NEC totalis) 2 Milk curd obstruction
Anorectal malformation	5	5 (100%)
Congenital diaphragmatic hernia	6	6 (100%)
Exomphalos	2	2 (100%)
Tracheoesophageal fistula with esophageal atresia	12	12 (100%)
Abdominal mass	2	2 (100%) 1 Ovarian cyst 1 Lymphatic malformation
Others	8	6 (75%)
CCAM	1	1 Loculated pneumothorax
Face laceration	1	1 Face laceration suture
Gastrostomy	1	1 Gastrostomy
Incarcerated inguinal hernia	3	2 Inguinal hernia repair, 1 hydrocele
Stoma closure	1	1 Stoma closure
Gastrointestinal haemorrhage	1	1 Swallowed maternal blood

CCAM: congenital cystic adenomatoid malformation.

suspected surgical necrotising enterocolitis (NEC) and bowel obstruction. 53% of referrals for surgical management of NEC required intervention. Despite increased antenatal diagnosis, deliveries of babies with congenital abnormalities are still occurring outside of surgical centres, requiring transportation after delivery.

CONCLUSIONS

Transfer of the surgical newborn constitutes significant unplanned activity for regional transport teams. The majority of babies were more mature, and referred early in life. Whilst accuracy for most suspected surgical conditions is high, neonates with bilious vomiting continue to pose a dilemma.

ABS 8

AUDIT OF VENTILATED NEONATAL TRANSFERS IN NORTHERN IRELAND FROM 1ST JANUARY 2017 UNTIL 1ST MAY 2017

R. Moore, S. Knox

Northern Ireland Specialist Transport and Retrieval (NISTAR), Royal Jubilee Maternity Hospital, Belfast, Northern Ireland

INTRODUCTION

This audit had 4 main objectives. The first was to determine the types of transfers being carried out. The second was to establish the number of hypothermic infants on transfer. The third was to determine if infants were being transferred with a satisfactory endotracheal tube position and the fourth was to assess the number of infants who had poor blood gases either at the referral or the receiving centre.

MATERIALS AND METHODS

We reviewed the transport documentation for all ventilated neonates moved over a 4 month period. We also accessed our laboratory and radiology systems for information on blood gases and radiographs respectively.

RESULTS

We attended 38 ventilated neonates, 37 of whom were transferred. 42% of calls were going to and from theatre. The overarching diagnosis was extreme prematurity. 18% of patients were hypothermic at the referral unit and 8% were hypothermic at the receiving unit. 22% of patients had an endotracheal tube in an unsatisfactory position, half of these were re-adjusted before departure and half on arrival at the receiving centre. 24% of patients had a poor blood gas in the

referral centre. 13% of patients had a poor blood gas on arrival at the receiving unit. Of the total number of patients that had a poor blood gas, 42% of them were post-operative.

CONCLUSIONS

The audit has demonstrated that hypothermia is largely being addressed before departure. 11% of our patients were transferred with an endotracheal tube in an unsatisfactory position. All of these patients came from theatre. This raises the question around infants having chest radiographs after intubation in theatre rather than on return to the neonatal unit. The data from our blood gases also suggests that surgical neonates are a particularly vulnerable group and would benefit from more frequent blood gas sampling during surgery.

ABS 9

“HUB AND SPOKE” ECMO IN NEONATES WITH MECONIUM ASPIRATION SYNDROME: A PRELIMINARY REPORT

N. Doglioni¹, D. Fichera², F. Zanella², M. Padalino³, V. Vida³, G. Stellin³, P. Lago¹, D. Trevisanuto¹

¹Neonatal Intensive Care Unit, Department of Women and Children Health, University of Padua, Padua, Italy

²Cardiovascular Perfusion Unit, University of Padua, Padua, Italy

³Pediatric and Congenital Cardiac Surgery Unit, Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, Padua, Italy

INTRODUCTION

ExtraCorporeal Membrane Oxygenation (ECMO) is today a well established rescue therapy for severe respiratory failure in neonates with Meconium Aspiration Syndrome (MAS), with survival rates greater than 94%. In Italy, only few hospital are able to perform Neonatal ECMO implantation and retrieval from peripheral hospitals (“Hub and Spoke”).

MATERIALS AND METHODS

Padua teaching hospital is currently the “Hub” ECMO Center in the North-East Area of Italy. Peripherally centers (“spoke”) can call to request our team’s assistance to ECMO. Team Activation Time (TAT) represents the period elapsed from the triage of the first call to the beginning of the ECMO support. Our Team is made up of 1 Neonatologist (Consultant), 1 Pediatric Cardiac Surgeon (Consultant), 1 Pediatric Cardiac Surgeon (Resident), 1 Perfusionist and 1 Pediatric-Neonatal Nurse.

Table 1 (ABS 9). All patients were weaned off ECMO support without complications after 2.75 ± 1 days.

N	Cannulation time (min)	ECMO mode	Blood pump	Oxygenator	ECMO blood flow during transportation (mL/min)	Length of ECMO support (days)	Cardiac ICU LOS (days)	NICU LOS (days)
1	25	V-A	Maquet PLS Rotaflow	Lilliput 2 ECMO	500	1	3	11
2	18	V-A	Sorin Lifebox Revolution 5	Lilliput 2 ECMO	350	2	5	10
3	18	V-A	Thoratec Centrimag	Lilliput 2 ECMO	630	4	5	10
4	20	V-A	Maquet PLS Rotaflow	Quadrox-i Pediatric	450	4	6	20

ECMO: ExtraCorporeal Membrane Oxygenation; ICU: Intensive Care Unit; NICU: Neonatal Intensive Care Unit; LOS: length of stay.

RESULTS

From May 2014 to December 2016, 6 newborns with diagnosis of MAS were initially eligible for ECMO. Two of these patients were subsequently excluded. The longest distance covered by ground transport was 150 km. We traveled by dedicated ambulances followed by military vans to carry equipment and a supplementary emergency backup. All patients underwent surgical neck vessel cannulation (Right Carotid Artery and Jugular Vein) to establish Venous-Arterial ECMO. A portable Heater-Cooler Unit (HCU) has been added. After ECMO implantation and stabilization, patients were transferred to our Pediatric Cardiac Intensive Care Unit.

All patients were weaned off ECMO support without complications after 2.75 ± 1 days, then transferred to Neonatal Intensive Care Unit (**Tab. 1**). At follow-up evaluation all patients have a normal neurodevelopment.

CONCLUSIONS

MAS is a lifethreatening condition that may require the implementation of emergent respiratory ECMO support. A specialized mobile multidisciplinary ECMO team of expert surgeons, nurses, perfusionists and neonatologists is crucial for the successful management and outcome of these acutely ill newborns in peripheral hospitals.

ABS 10

INTRA-HOSPITAL TRANSPORTATION OF EXTREMELY PRETERM INFANTS AND INCIDENCE OF INTRAVENTRICULAR HAEMORRHAGES

N. Wadström¹, M. Breindahl¹, B. Hallberg^{1,2}, B. Skiöld^{1,3}

¹Patient Area Neonatology, Karolinska University Hospital, Stockholm, Sweden

²Department CLINTEC, Karolinska Institutet, Stockholm, Sweden

³Department of Women's and Children's Health, Karolinska Institutet, Stockholm, Sweden

INTRODUCTION

Transportation of extremely preterm infants is a known risk factor of intraventricular haemorrhage (IVH). When the new Karolinska University Hospital opened, the Neonatal and Delivery units were separated, resulting in a 900-meter long intra-hospital culvert transfer of all admitted infants.

Aim: to evaluate short-term mortality and incidence of IVH following intra-hospital transfer in extremely preterm newborns.

MATERIALS AND METHODS

All infants born < 27 weeks during 6 months following the move (transported group: November 2016-May 2017, n = 29) were compared to a control group born during the 6 preceding months (May 2016- November 2016, n = 25). All cranial ultrasound reports were reviewed by two neonatologists and graded according to a modified Papile classification; IVH grade I to III and periventricular hemorrhagic infarction as IVH grade IV.

RESULTS

Fifty-four extremely preterm infants were born during the one-year study period. We found no significant differences between the transported and the control group regarding gestational age (mean 24.4 ± 1.1 versus 24.6 ± 1.1 weeks), birth weight (mean 687 ± 139 versus 687 ± 140 g), sex, mode of delivery, multiple pregnancies, or APGAR score ($p > 0.05$ for all). Mortality in both groups was similar; 31% (9/29) in transported versus 20% (5/25) in controls ($p > 0.05$). Four infants died in the delivery unit (2 in each group) and no ultrasound was performed. The incidence of any IVH was similar between groups: 37% (10/27) in transported infants versus 48% (11/23) in controls ($p > 0.05$). We found

no differences in low-grade or higher grade IVH or bilaterality of lesions between groups.

CONCLUSIONS

Our preliminary analysis of extremely preterm infants exposed to an early intra-hospital culvert transfer of 900 meters revealed no differences in mortality or IVH. Data collection will continue until the delivery ward has moved into the new hospital, and long-term outcomes will be determined before definite conclusions on safety can be drawn.

ABS 11

RISK OF POSTNATAL TRANSPORT AND OUTCOME OF LATE PRETERM INFANTS BORN AT NON-TERTIARY CENTRES: A RETROSPECTIVE COHORT STUDY

N. Doglioni¹, L. Salmaso², P. Facchin², D. Trevisanuto¹

¹Neonatal Intensive Care Unit, Department of Woman's and Child's Health, University of Padua, Padua, Italy

²Epidemiology and Community Medicine Unit, Unit-Department of Woman's and Child's Health University of Padua, Padua, Italy

INTRODUCTION

Late preterm (LP) infants need more frequently neonatal resuscitation and have a higher incidence of postnatal problems than full term infants. The majority of LP infants was born at level I and II hospitals. We aimed to assess the risk of postnatal transport of LP infants born at non-tertiary centres (outborn) and to compare their outcomes with those of LP infants born at a level III hospital (inborn).

MATERIALS AND METHODS

We conducted a population-based cohort study of all LP infants who underwent urgent postnatal transfer in East Veneto region from 2003 to 2013 and compared morbidity and mortality with their counterparts born at tertiary centre and admitted to the neonatal intensive care unit.

RESULTS

There were 279,865 livebirths, 15,525 (5.5%) were LP infants, who accounted for 72.2% of preterm births. Transfer index (number of transferred neonates/number of total neonates) was 0.57% for the entire population, 0.2% for term infants and 2.0% for LP infants. In comparison to term infants, the relative risk of postnatal transport of LP infants was 7.43 (95% CI 6.51-8.47). Perinatal asphyxia

(RR 3.70; 95% CI 1.78-7.71), respiratory distress (RR 1.23; 95% CI 1.15-1.32) and pneumothorax (RR 2.85; 95% CI 1.78-4.52) were significantly higher in outborn than inborn LP infants. Outborn LP infants needed more frequently mechanical ventilation (RR 1.70; 95% CI 1.34-2.16) and chest tube positioning (RR 2.05; 95% CI 1.02-4.09) and had a longer hospitalization: 11 days (IQR 7-8) vs. 7 days (IQR 4-16); $p < 0.001$.

CONCLUSIONS

LP infants have a risk of postnatal transfer about 7 times higher than full term infants.

LP infants born in non-tertiary hospitals have an increased morbidity and longer hospitalization compared to their counterparts born at level III centers.

These findings may have implications for families, healthcare providers and healthcare policy.

ABS 12

COMPARING THREE METHODS OF THERAPEUTIC HYPOTHERMIA ON TRANSPORTATION: A SINGLE CENTRE CANADIAN EXPERIENCE

H. Zein, S. Thomas, K. Yusuf, S. Vayaltrikovil, R. Paul, S. Dossani, K. Kapores, K. Pearson-Mitchell, K. Mohammad

Department of Pediatrics, University of Calgary, Calgary, Canada

INTRODUCTION

Therapeutic hypothermia (TH) is the standard of care for eligible neonates with hypoxic ischemic encephalopathy (HIE). Initiation of TH for babies born outside tertiary centres and maintaining temperature within target range on transportation remains a challenge. We report our experience using three different methods of cooling.

MATERIALS AND METHODS

Between January 2013 and March 2015, 39 neonates with moderate to severe HIE were passively cooled. Since April 2015, 23 neonates were actively cooled using cold gel packs. In February 2017, a servo-controlled active cooling device (Tecotherm Neo, Novus Medical, ON, CA) was used on 9 neonates. We compared time to reaching target temperature of 33.5-34.5°C, and maintenance of temperature within the target range using the three methods.

RESULTS

Seventy-one neonates with moderate to severe HIE were cooled between January 2013 and May 2017.

Table 1 (ABS 12). Comparing efficiency of cooling among the three methods.

	Method of cooling		
	Passive	Gel packs	Servo-control
Reached target temperature	54%	74%	100%
Time to target temperature (mean in minutes)	378	410	288
Maintained TH within target	26%	53%	100%
Temperature change (mean)	1.50	1.70	0.60*
Highest temperature (mean)	34.8	34.6	33.7*
Temperature at level 3 (mean)	34.2	33.6	33.4*

TH: therapeutic hypothermia.

The median gestation age was 39 weeks and median birth weight was 3,455 g. Demographic variables were similar among the three groups except for cord pH which was significantly lower in the servo-control group.

More babies reached and stayed within the target temperature, had less temperature fluctuation, and less hyperthermia when using the servo-controlled method. Time to target temperature was earlier by at least 90 minutes in this group (**Tab. 1**).

CONCLUSIONS

Active cooling using a servo-controlled device is more effective in reaching and maintaining temperature within the target range compared to gel packs and passive cooling. A larger number of babies is required to assess this effect on acute brain injury.

ABS 13

USE OF TECOTHERM NEO TO MAINTAIN NORMOTHERMIA IN EXTREME PRETERM INFANTS DURING TRANSPORT AS A QUALITY IMPROVEMENT PROJECT

I. Fierens, P. Rusinga, L. Kelly, A. Iqbal, N. Ratnavel

Neonatal Transfer Service NTS, London, UK

INTRODUCTION

Maintaining normothermia in extreme low birth weight infants is clinically important and also a quality indicator of a well performing retrieval service. Using recognised warming adjuncts like plastic wrap, humidified gases and transwarmer yields a temperature variability between high and low (retrospective data collection).

Therefore a closed loop system which constantly measures core temperature via rectal probe and maintains a set temperature via body-wrap liquid-filled mattress is introduced.

The aim is for all preterm infants < 28/40 weeks to achieve and maintain a set core temperature between 36.5 and 37.5°C during transfer by NTS between units.

MATERIALS AND METHODS

Criteria for inclusion are all preterm neonates < 28/40 weeks, < 14 days old at referral and/or < 1 kg. Contraindications and risks were listed. This focuses mainly on fragility of the skin as well as any preexisting abdominal/rectal conditions.

Numerous PDSA (plan-do-study-act) cycles were run during the introductory process. First within the core team later expanding to other team members during the implementation phase. Meticulous attention was paid to the size of the mattress and the diameter and depth of insertion of the rectal probe with advice from pediatric surgeons. Stakeholders were identified and in-house teaching was provided.

RESULTS

The preliminary data show that temperature can be maintained within the set range of temperature without deviation. Also no adverse events regarding skin or rectal mucosa were noticed.

CONCLUSIONS

Introducing the Tecotherm Neo has the capacity to improve thermal stability in extreme preterm infants during inter-hospital transfer.

ABS 14

CARDIOPULMONARY POINT-OF-CARE ULTRASOUND (POCUS) IN THE NEONATAL TRANSPORTATION

W. Durlak¹, M. Jagła¹, K. Starzec¹, A. Grudzień¹, T. Tomasik¹, P. Błoński², P. Kwinta¹

¹Department of Pediatrics, Jagiellonian University Medical College, Krakow, Poland

²Pediatric Emergency Department, University Children's Hospital, Krakow, Poland

INTRODUCTION

Immediate and accurate diagnosis of the critically ill neonate in transport is both essential and challenging. Two of the most common groups of conditions, severe circulatory and pulmonary disease, are often difficult to distinguish clinically. Numerous studies indicate that physical examination is often inaccurate in differential diagnosis.

The aim of the study is to evaluate cardiopulmonary point-of-care ultrasound (POCUS) accuracy in diagnosis of critically ill neonate during transportation.

MATERIALS AND METHODS

We prospectively enrolled a sample of neonates transferred to the tertiary NICU because of respiratory or circulatory failure in whom ultrasound had been performed prior to transportation by the member of transport team. The method for performing heart and lung sonography has been previously described. Referring physicians named the most likely diagnoses based on history, physical examination and chest X-ray. An investigator then performed cardiopulmonary ultrasound after which most likely diagnosis was established. Final diagnosis (gold standard) was based on medical record from the tertiary unit. We compared accuracy of pre-POCUS and post-POCUS diagnosis.

RESULTS

105 newborns have been enrolled. The leading final diagnoses were: RDS (53%), PTX (13%), pneumonia (8%), CDH (4%), critical CHD (5%) and shock (3%). Overall accuracy of the referring physician's diagnosis increased from 83% before POCUS to almost 99% after POCUS ($p < 0.01$). The most significant improvement was observed for PTX diagnosis – accuracy increased from 57% before to 100% after ultrasound. POCUS changed clinical decisions in 32% of patients.

CONCLUSIONS

Cardiopulmonary ultrasound evaluation before transportation improved diagnostic accuracy in differentiating respiratory or cardiac failure in critically ill neonates.

Education and skills

ABS 15

OUR EXPERIENCE IN NEONATAL AND PEDIATRIC TRANSPORT HIGH FIDELITY SIMULATION SCENARIOS

N. Torre, N. Millan, C. Alexandre, D. Vila, A. Olego, M.P. Larrosa, J.M. Quintilla, E. Esteban

Sant Joan de Deu Hospital, Barcelona, Spain

INTRODUCTION

High and low fidelity simulation has been used in hospital situations with satisfactory results. However, we realised that this kind of simulation was not focused on neonatal and pediatric transport scenarios either for internal or external courses. The aim is to improve self-confidence, ethical decision-making confidence, crisis management, medical skills and team work of our transport team and residents. Plus, we would like to share our knowledge with medical staff of other hospitals, mainly for the referring and referral hospitals of our network.

MATERIALS AND METHODS

Six transport team members were trained as high-fidelity instructors. The needs of the team were assessed following an internal survey. Each scenario was run for three-four participants, two facilitators, one technician and one instructor, who was also responsible for debriefing. The scenarios were set in a high fidelity simulation room in our hospital and in our ambulance. The assistance to the internal course was voluntarily.

RESULTS

We have been running quarterly internal simulation scenarios, biannual teaching with residents and annual external course. From 2014 to 2016, there were 11 internal simulation scenarios where 3 were monographic (arrhythmia, difficult airway and communication skills), 3 crisis management and 5 sessions with miscellaneous cases. All the members of the transport team attended to the course, although assistance was voluntarily. There were 6 resident courses and 3 annual external courses, where the simulation scenarios were similar to the miscellaneous cases of the internal simulation course. Informal participant's feedback was completely satisfactory, increasing self-confidence, ethical decision-making confidence, medical skills and teamwork.

CONCLUSIONS

High fidelity simulation in neonatal and pediatric scenarios is an educational tool that promotes medical skills, self-confidence and improve teamwork. The peculiarities of neonatal and pediatric transport allow for vast possibilities of different scenarios approaching medical staff with different backgrounds (residents, referral and referring hospital staff and transport team staff).

ABS 16

AN EVALUATION OF THE PRE-TRANSFER STABILISATION OF PRETERM INFANTS FOLLOWING PATENT DUCTUS ARTERIOSUS LIGATION BY THE LONDON NEONATAL TRANSFER SERVICE

C. Warrick, J. Ragasan, P. Rusinga, F. Barker

Neonatal Transport Service, The Royal London Hospital, London, UK

INTRODUCTION

Of those infants with a haemodynamically significant patent ductus arteriosus (PDA), 10-24% will require surgical ligation. In the UK patients needing specialist cardiac surgical intervention commonly require transfer between cardiac and neonatal centres. To date there is no literature that describes transfer in relation to PDA ligation. This service evaluation addresses the post PDA ligation pre-transfer stabilisation of preterm infants in London, UK.

MATERIALS AND METHODS

A retrospective case note review was conducted. This included all infants referred for transfer following ductal ligation by the London Neonatal Transfer Service (NTS), and aborted transfers, over a 12 month period (2016). Data was collected in three epochs: 1) after surgery (specialist centre); 2) peri-transfer (transfer team); 3) during transfer. Data included: change in ventilatory requirements (defined as an increase in $\text{FiO}_2 > 0.05$); fluid and inotropic support; and analgesia.

RESULTS

31 infants were included in the study, of which 30 were transferred. All infants were ventilated, 29 invasively and 1 non-invasively. There was an increased oxygen requirement in 60% of the transferred patients (18/30).

Cardiovascular support was augmented in 10% (3/30) of infants: 3 patients required supplemental fluid therapy and 1 patient inotropic treatment, all of which were instigated prior to transfer.

Additional analgesia was given peri-transfer in 43.3% of cases (13/30). In 66.6% (20/30) a morphine infusion of ≥ 20 mcg/kg/hour and/or additional boluses were required to provide adequate analgesia for transfer (**Tab. 1**). No further adjustments were made thereafter.

CONCLUSIONS

All infants transferred following ductal ligation required ventilatory support, oxygen and analge-

Table 1 (ABS 16). Analgesia in the cardiac centre and during stabilization by the Neonatal Transfer Service (NTS).

Analgesia	Cardiac centre % (n/total)	During stabilization % (n/total)
Morphine < 20 mcg/kg/hour	40 (12/30)	26.7 (8/30)
Morphine ≥ 20 mcg/kg/hour	40 (12/30)	60 (18/30)
Morphine boluses	3.3 (1/30)	10 (3/30)
Paracetamol alone	3.3 (1/30)	3.3 (1/30)
Oral morphine	3.3 (1/30)	3.3 (1/30)
No analgesia	10 (3/30)	0 (0/30)

sia. In order to stabilise patients adequately for transfer, adjustments to therapy were required, predominantly in oxygen delivery and analgesia. Findings from this service evaluation have been used to develop a quality improvement project comparing the effect of providing standardised advice at referral for transfer on stabilisation requirements.

ABS 17

THE NEONATAL INTENSIVE TRANSPORT TEAM IN UPPSALA, SWEDEN: A DESCRIPTION OF WORKING METHODS FROM A REGISTERED NURSE PERSPECTIVE

A. Backström, S. Fäldt

Neonatal Intensive Care Unit, Uppsala University Children's Hospital, Uppsala, Sweden

INTRODUCTION

The neonatal transport team in Uppsala is one of three neonatal transport teams in Sweden. The team undertook their first transport in 1993 and gradually the number of transports has increased since then. Maintaining systematic work with retained patient safety is of great importance.

MATERIALS AND METHODS

Compilation of data from the last ten years' transport journals. Description of the training routines and working methods of the registered nurses included in the team.

RESULTS

Over a ten-year period (2006-2016) the transports have increased from 96 to 249 per year. The transports are performed by helicopter, fixed wing or ambulance. It is a dedicated national neonatal transport service team with around the

clock coverage. Time to take-off is one hour from call on standby. The team consists of eight neonatologists and eight registered nurses with specialist training in neonatal intensive care. The competence required to be a part of the team is at least five years working experience as a specialist and training in neonatal intensive care. The registered nurse is on call 24 hours and, if not on transport, he/she is working daytime in the NICU. To maintain the required skills each team member must take part in an annual training of safety routines at the air base in Uppsala. To reduce separation between the infant and their parents, the aim is to standardize the procedure of bringing one parent with the infant during transport.

CONCLUSIONS

The competence of, and the cooperation between, all members of the team is of great importance for safe transports. The number of transports is expected to increase due to the increased birth rate and centralization of neonatal intensive care in Sweden. This situation places great demands on the skills of those working in the team.

ABS 18

PARTICIPANTS' EXPERIENCE IN NEONATAL AND PEDIATRIC TRANSPORT HIGH FIDELITY SIMULATION COURSE

N. Torre, N. Millan, C. Alejandre, D. Vila, A. Olego, M.P. Larrosa, J.M. Quintillá, E. Esteban

Sant Joan de Deu Hospital, Barcelona, Spain

INTRODUCTION

High and low fidelity simulation has been used in hospital situations with satisfactory results. However, these kind of simulations were not focused on neonatal and pediatric transport scenarios. Hence, we have been running satisfactorily an annual high fidelity simulation course with neonatal and pediatric transport scenarios from 2014 to 2016.

We reported the feedback for participants attending to our courses in relation with high fidelity simulation transport scenarios.

MATERIALS AND METHODS

We have done an annual simulation course during the last three years with neonatal and pediatric transports scenarios. The courses had between 17 and 31 participants. Each scenario was run for four

participants, two facilitators, actors, one technician and one instructor, who was also responsible for debriefing. The scenarios were set in a high fidelity simulation room in our hospital and in our ambulance. The duration of each scenario was 20 minutes and 30 minutes for the debriefing. Participants were asked regarding quality of instructors and documentation, methodology, organization and utility of the course. The marks were from 0 (min) to 10 (max).

RESULTS

Results are summarised in **Tab. 1**. The mean global qualification of the course was 9.03 (SD 0.82), showing an upward trend of improvement (p 0.093). Mean participants feedback regarding instructors and documentation was 9.2 (SD 0.67); methodology 8.74 (SD 0.98); organisation 9.09 (SD 0.87) and utility of the course 9.03 (SD 1). The improvement of the evaluation of the instructors and documentation was statistically significant (p 0.003). There was an upward trend in the acquisition of new skills (p 0.083) and the allotted time (p 0.064).

CONCLUSION

High fidelity simulation in neonatal and pediatric scenarios is an educational tool with a great positive feedback from the participants. The results of the opinion survey challenge us to improve over the years, showing a parallel learning curve with the satisfaction of the participants.

ABS 19

SPECIFIC TRAINING ON NEONATAL TRANSPORT: THE SEM-PEDIATRIC VALL D'HEBRON COURSE

A. Gallardo¹, T. Esclapés¹, O. Rodríguez¹, L.L. Subirana¹, M.M. Pardo¹, R. Jordán¹, E. Castellarnau², P. Domínguez¹

¹*Pediatric Transport Unit (SEMPVH), Vall d'Hebron University Hospital, Barcelona, Spain*

²*Pediatric Service, Joan XXIII University Hospital, Tarragona, Spain*

INTRODUCTION

There is not much information about specific courses on the transport of the neonate worldwide. SEM-Pediatric Vall D'Hebron (SEMPVH) is a dedicated combined neonatal and pediatric transport team from Barcelona (Spain) with an active teaching program since 2002, which includes a pediatric and neonatal transport course. The aim

Table 1 (ABS 18). Opinion survey results of the transport simulation course.

		2014 Mean (SD)	2015 Mean (SD)	2016 Mean (SD)	Total
Instructors and documentation		8.87 (SD 0.72)	9.44 (SD 0.47)	9.40 (SD 0.61)	9.2 (SD 0.67) p 0.003 ^a
1a.	Have they explained with clarity?	8.66 (SD 0.99)	9.15 (SD 0.91)	9.27 (SD 0.86)	p 0.064
1b.	Have they raised your interest?	8.81 (SD 1.03)	9.31 (SD 0.91)	9.25 (SD 0.93)	p 0.091
1c.	Have they raised questions that would induce you to think?	8.73 (SD 1.06)	9.20 (SD 0.93)	9.03 (SD 1.31)	p 0.079
1d.	Have they encouraged participation?	8.65 (SD 1.02)	9.36 (SD 0.87)	9.32 (SD 1.07)	p 0.005 ^a
1e.	Have they listened with interest to the questions asked?	9 (SD 0.91)	9.47 (SD 0.83)	9.59 (SD 0.70)	p 0.025 ^a
1f.	Have they facilitated the exchange of experiences?	8.64 (SD 1.06)	9.44 (SD 0.78)	9.55 (SD 0.62)	p 0.002 ^a
1g.	Have they created a climate of trust?	8.82 (SD 1.22)	9.73 (SD 0.51)	9.61 (SD 0.61)	p 0.010 ^a
1h.	Did they master the subject to be developed?	9.25 (SD 0.91)	9.53 (SD 0.68)	9.61 (SD 0.61)	p 0.418
1i.	Have you been satisfied with the documentation?	7.71 (SD 1.68)	9.15 (SD 0.91)	8.01 (SD 1.77)	p 0.025 ^a
Methodology		8.52 (SD 1)	8.78 (SD 0.96)	9.11 (SD 0.92)	8.74 (SD 0.98) p 0.155
2a.	Has the structuring of the content been successful?	8.30 (SD 1.21)	8.32 (SD 1.43)	9.18 (SD 0.75)	p 0.132
2b.	Have you acquired new knowledge?	8.71 (SD 1.04)	8.99 (SD 1.09)	9.09 (SD 0.88)	p 0.343
2c.	Have you acquired new skills?	6.80 (SD 1.74)	8.65 (SD 1.32)	8.88 (SD 1.22)	p 0.083
2d.	Have the course objectives been covered?	8.76 (SD 0.99)	9.13 (SD 0.95)	8.83 (SD 1.30)	p 0.248
2e.	Was the allotted time adequate?	7.74 (SD 0.99)	7.74 (SD 1.55)	8.86 (SD 1.12)	p 0.064
2f.	Has the methodology been adequate to the stated objectives?	8.45 (SD 1.06)	8.59 (SD 1.18)	8.95 (SD 0.97)	p 0.353
Organization		8.77 (SD 1.13)	9.28 (SD 0.70)	9.06 (SD 0.87)	9.09 (SD 0.87) p 0.611
3a.	Has the organization been correct?	8.93 (SD 1.06)	9.06 (SD 1)	9.14 (SD 0.90)	p 0.902
3b.	Have all organizational aspects been taken care of?	8.93 (SD 1.06)	9.08 (SD 1.01)	9.25 (SD 0.93)	p 0.661
3c.	Have the premises been adequate?	9.10 (SD 0.91)	9.46 (SD 0.74)	9.53 (SD 0.71)	p 0.195
3d.	Has the price/quality ratio been adequate?	8.53 (SD 1.14)	8.72 (SD 1.41)	7.64 (SD 1.68)	p 0.092
Utility of the course		8.77 (SD 1.13)	9.27 (SD 0.68)	9.09 (SD 1.13)	9.03 (SD 1) p 0.266
4a.	To what extent have the knowledge acquired been useful to your work?	8.63 (SD 1.19)	9.16 (SD 0.83)	9.11 (SD 1.03)	p 0.292
4b.	To what extent have the expectations of the course been fulfilled?	8.58 (SD 1.15)	9.23 (SD 0.85)	8.66 (SD 1.39)	p 0.142
Total		8.78 (SD 0.86)	9.19 (SD 0.70)	9.21 (SD 0.86)	9.03 (SD 0.82) p 0.093

^aStatistically significant.

of this work is to present the pilot experience with a specific neonatal course targeted to a group of professionals from two general district hospitals involved in the implementation of a new neonatal transport team in the area of Tarragona (Catalonia, Spain).

MATERIAL AND METHODS

Description of main features of the course. Data were obtained from the systematic records generated by SEMPVH, which included the results of a satisfaction questionnaire filled in anonymously by participants at the end of the course.

RESULTS

General objective of the course: to gain knowledge, skills and attitudes related to the interhospital transport of neonates (organizational, operational and clinical care aspects). Course accreditation by the Catalan Council for the Continued Education of Health Care Professionals (3.3 credits). Duration of face-to-face phase: 15 hours. Lectures/discussions/practical stations ratio: 1/1.2/2.9. Practical training included 3 stations specifically oriented to neonatal transport: stabilization at referring hospital (2 hours), transport on ambulance (2 hours) and physical transferrance (1 hour). Participant/instructor ratio: 1.8/1. Participants: 32; profiles: neonatologists (6), pediatricians (17) and EMS nurses (9). Response index to questionnaires: 31/32 (97%). Level of participants' satisfaction (1-6): contents, 5.72; methodology, 5.55; applicability, 5.54; global satisfaction, 5.52.

CONCLUSIONS

The proposed course meets needs of participants interested in interhospital transport of neonates and generates a high level of satisfaction. Therefore, it might be an appropriate educational tool for specific training on neonatal transport.

Equipment

ABS 20

A TAILORED INHALED NITRIC OXIDE (iNO) THERAPY DEVICE IN CASES OF LOW ANNUAL USE IN NEONATAL EMERGENCY TRANSPORT

C. Bellini, L.A. Ramenghi

Neonatal Intensive Care Unit, Neonatal Emergency Transport Service, IRCCS Istituto Giannina Gaslini, Genoa, Italy

INTRODUCTION

It is well established that the use of inhaled Nitric Oxide (iNO) to treat persistent pulmonary hypertension (PPH) in near-term and term neonates significantly improves oxygenation. iNO administration equipment is part of the specific recommendations for Neonatal-Pediatric Transport. In this brief communication we describe a customized iNO therapy device for use in our Neonatal Emergency Transport Service (NETS) in Liguria region, Italy. The epidemiological regional data regarding the need for iNO therapy are not reported for space limitation. The actual situation in our opinion do not warrant keeping the iNO device permanently assembled in the transport trolley.

MATERIALS AND METHODS

We decided to design and to build a semi-permanent device mounted inside the ambulance; this device is therefore always available during transport.

RESULTS

The project of the semi-permanent device and the final assembly of the various elements of the device are presented as well as the operating procedures.

CONCLUSIONS

In our regional setting of perinatal care iNO therapy is not available at all referring hospitals. We consider our solution safe, cheap and appropriate in our specific setting. The portable device described herein is certified and authorised for use in Italy; no specifications have been provided on "how" we must use the device, i.e., if it has to be anchored to the ambulance, or to the trolley, or other possibilities. We believe that the proposed device may be a satisfactory solution in cases of low annual iNO therapy use in neonatal transport, avoiding the risk of overloading the transport trolley while being sure of the possibility to treat severely affected newborns at any time.

ABS 21

TELEMEDICINE: A CHRISTCHURCH EXPERIENCE

A. Jackson

Neonatal Intensive Care Unit., Christchurch Women's Hospital, Christchurch, New Zealand

INTRODUCTION

Telemedicine uses information and communication technology to deliver patient care

from a distance. When providing acute care in isolated or rural locations telemedicine can have a positive impact by reducing the barriers of both time and distance. Telemedicine provides the referral centre access to specialist support whilst the retrieval team is en-route and to the transport team during the stabilisation process.

Christchurch Women's Hospital (CWH) located in the South Island of New Zealand is the tertiary referral centre for infants from the Canterbury district. The total referral area covers approximately 68,000 square kilometres.

We describe a case to illustrate how telemedicine can have a positive effect on the management of a critically unwell infant at Grey Base Hospital. This is a remote, rural secondary hospital with no resident paediatrician on the West Coast of the South Island 250 km and two alpine passes from Christchurch.

Baby B. was 37 weeks gestation with antenatal scans showing multicystic dysplastic kidneys with probable posterior urethral valves and oligohydramnios. He had an unplanned delivery in Greymouth and developed severe respiratory distress and pulmonary hypertension and was referred to CWH for retrieval.

MATERIALS AND METHODS

Video telecommunication technology was used during this retrieval allowing real time visual and audio transmission of information. High resolution screens, cameras with remote pan, tilt and zoom functions provided detailed images of the infant, monitors and staff. Other communication technology contributing to this infants care were: digital radiography, digital notebook, cell phone, i-STAT blood gas analyser and patient archive communication system.

RESULTS

This retrieval utilised telemedicine which had a positive effect on the management of a critically unwell infant in a remote secondary hospital.

CONCLUSIONS

Telemedicine and technologic advances reduce the barriers of time and distance, provide quicker access to specialist care and can lead to safe effective and timely care.

ABS 22

PROVISION OF NASAL HIGH-FLOW THERAPY (HFT) USING VAPOTHERM® DEVICE FOR NON-INVASIVE RESPIRATORY SUPPORT DURING NEONATAL TRANSPORT

H. Ambulkar¹, A. Verma², J. Khanna³, J. Mutch⁴, A. Nichols¹, S. Pattnayak¹

¹Kent Neonatal Transport Services, Medway NHS Foundation Trust, Gillingham, Kent, UK

²East Surrey Hospital, Redhill, Surrey, UK

³Tonbridge Wells Hospital, Tunbridge Wells, Kent, UK

⁴St Georges' Hospital, London, UK

INTRODUCTION

Use of heated, humidified, high-flow nasal cannulae is emerging as a popular non-invasive respiratory support in neonatal units. It is proving to be a safe alternative to nasal continuous positive airway pressure. Its use during neonatal transport has been reported.

Aim: to compare Vapotherm® flow and FiO₂ with SpO₂ and blood gas values before and after the transfer.

MATERIALS AND METHODS

The retrospective data of all babies transferred on Vapotherm® during study period from 01 June 2015 to 31 May 2016 constituted Epoch 1. Subsequently, prospective data were collected on all Vapotherm® transfers from 01 June 2016 to 31 May 2017, which constituted Epoch 2. Demographic details, reason for transfer according to BAPM dataset, journey distance and adverse events were recorded. Vapotherm® flow, FiO₂, SpO₂, temperature and blood gas values were collected before and after transfer. Statistical analysis was carried out by paired t test using SPSS® version 19.

RESULTS

36 babies in Epoch 1 and 46 babies in Epoch 2 were transferred using Vapotherm® device. Median gestation and body weight at transfer were 32⁺² weeks and 1,456 grams in Epoch 1, 32⁺⁵ weeks and 1,565 grams in Epoch 2. BAPM dataset for reasons of transfer and level of care are shown in **Tab. 1**. Flow rate, FiO₂, SpO₂ and PaO₂ are shown in **Tab. 2**. Flow rate did not change significantly, however the FiO₂ has increased during transfer in both study periods, so as SpO₂ in Epoch 2. Changes in blood gas values were not statistically significant. Two episodes of UPS battery failure reported in Epoch 1 and none in Epoch 2.

CONCLUSIONS

Vapotherm® provided an effective and safe non-invasive respiratory support for babies during transfer. This is the largest series of babies reported on use of Vapotherm® device for high-flow therapy (HFT) during neonatal transport over two years period.

Table 1 (ABS 22). BAPM dataset.

	Epoch 1 (n = 36)	Epoch 2 (n = 46)	Operational reason	Epoch 1 (n = 36)	Epoch 2 (n = 46)	Level of care	Epoch 1 (n = 36)	Epoch 2 (n = 46)
Medical	26	37	Repatriation	22	34	High dependency	34	43
Surgical	6	4	Uplift	8	8			
Cardiac	3	1	Resource/ capacity	5	4	Intensive care	2	3
Neurological	1	4	Out patient	1	0			

Table 2 (ABS 22). Vapotherm® flow and FiO₂ before and after transfer in two study periods; SpO₂ and PaO₂ before and after transfer in the second study period.

	Epoch 1 (n = 36) Mean ± SD	p-value	Epoch 2 (n = 46) Mean ± SD	p-value
Vapotherm® flow before transfer (l/min)	5.16 ± 1.589	0.323 (NS)	5.184 ± 1.92	0.673 (NS)
Vapotherm® flow after transfer (l/min)	5.31 ± 1.576		5.152 ± 2.005	
FiO ₂ before transfer (%)	26.35 ± 4.786	0.010	27.59 ± 8.126	0.00
FiO ₂ after transfer (%)	28.82 ± 6.904		29.57 ± 9.411	
SpO ₂ before transfer (%)			95.76 ± 2.814	0.028
SpO ₂ after transfer (%)			96.76 ± 2.945	
PaO ₂ before transfer (kPa)			5.48 ± 1.79	0.843 (NS)
PaO ₂ after transfer (kPa)			5.54 ± 1.09	

Family support during transport

ABS 23

DESIGN OF A CHILD FRIENDLY PEDIATRIC AND NEONATAL AMBULANCE IN CATALONIA, SPAIN

M. Sardà, N. Torre, A. Olego, M.P. Larrosa, M. Hernández, M.J. Tovar, A. Llorens, O. Rodríguez, E. Esteban

BP62 base, SEM Pediàtric, Sant Joan de Déu Hospital, Esplugues de Llobregat, Barcelona, Spain

INTRODUCTION

Needles, intravenous lines, blood procedures and closed spaces transformed hospital spaces into scary places for children.

However, incorporating visual art into these places as a part of a child-friendly healthcare minimize the fear, anxiety and suffering of children and their family.

There are two pediatric and neonatal ambulances in Catalonia. One pediatrician/neonatologist, a

pediatric nurse and a pediatric technician form each team.

Our aim was to convert our pediatric and neonatal ambulances to a child-friendly environment to decrease stress and anxiety of the patient, adapting the environment to the patient and their families.

MATERIAL AND METHODS

Child Dreams Foundation worked into two different projects for our ambulance: spaceship and submarine ambulances, which were designed by Chispum.

In addition, they facilitated a variety of entertainment like finger puppets, sketchbooks and tablets to watch animations and movies or listen to music during the transfer.

RESULTS

After a team meeting, the submarine ambulance theme based on the famous book of Jules Verne *20,000 leagues under the sea* was chosen (**Fig. 1**). The immediate and informal feedback of the team and families was great.

CONCLUSION

In the last year, the change in the environment of our ambulance may have improved the quality of care of our patients hoping to enhance the comfort of the patient and the entire family. Our next step is to compile staff and families feedback with surveys.

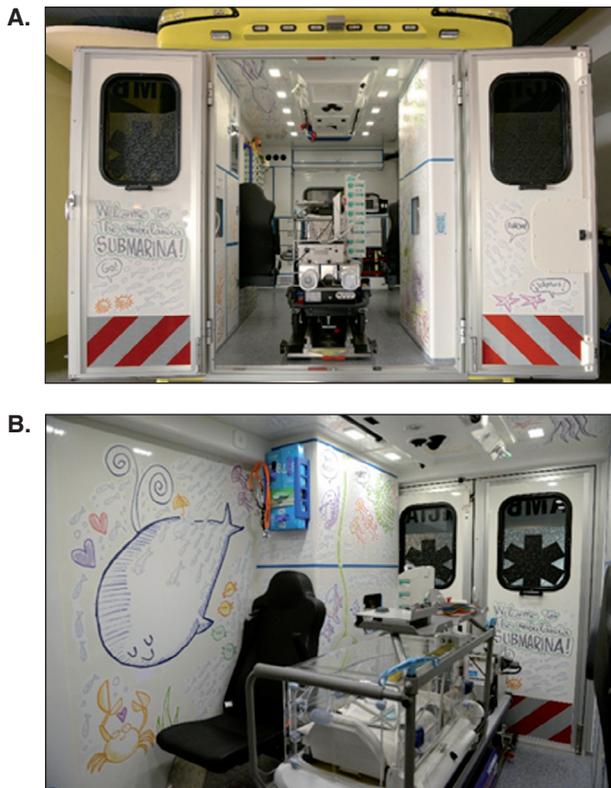


Figure 1 (ABS 23). The submarine ambulance theme based on the famous book of Jules Verne *20,000 leagues under the sea* was chosen.

ABS 24

THE LUCY AIR AMBULANCE FOR CHILDREN PARENTAL EXPERIENCE

N. Cleave, C. Jackson

Lucy Air Ambulance for Children Charity, London, UK

INTRODUCTION

Lucy Air Ambulance for Children (Lucy AAC) provides the safe and timely transfer of children to the hospital they need, facilitates inter-hospital transfers, repatriations and end of life care for children up to 16 years. To facilitate parental and family support during transfer, Lucy AAC employs a Head of Service. This coordination role provides a unique liaison link between hospital providers and families. Aims and objectives of this review were to evaluate parental satisfaction and experience of the service and identify any areas for improvement from parent and family perspective.

MATERIALS AND METHODS

Parents of infants transferred by Lucy AAC were invited by the Head of Service to complete an

online questionnaire consisting of a typical five level Likert scale with answers ranging from strongly agree to strongly disagree. An open ended question was included to elicit suggested areas of service improvement. Questions asked were related to all aspects of the transport process including communication and care provided by the service.

RESULTS

During the period 01/04/16 to 31/03/17 a total of 21 transfer requests were received and undertaken by Lucy AAC. 100% of respondents strongly agreed or agreed they were provided with sufficient information about the charity when informed that Lucy AAC would be responsible for the transfer of their child. Of particular note was the high level of satisfaction with the overall service provided by Lucy AAC Service with 100% satisfaction. No service improvement suggestions comments were made by respondents.

CONCLUSION

The coordination of air transfers and impact on parent experience and overall satisfaction cannot be underestimated. Communication with parents throughout the transfer process helps them become active participants in the transfer process and care of their child and promotes a safe and seamless service at what can be a very stressful and worrying time for the family.

ABS 25

CURRENT PARENT FEEDBACK RESPONSE RATES AND FEEDBACK METHODS IN THE NEONATAL TRANSPORT SERVICE ACROSS THE UK

P. Bhat^{1,2}, D. Winderbank-Scott^{1,2}, C. Garland^{1,2}, L. Watts^{1,2}, C. Leach^{1,2}, A. Frame², G. Bullimore², C. Lawn^{1,2}

¹Royal Sussex County Hospital, Brighton, Sussex, UK

²Sussex Neonatal Transport Service, Brighton, Sussex, UK

INTRODUCTION

Feedback and experiences of parents whose infants are transferred between hospitals by the neonatal transport service are essential for identifying areas where the service can be improved. Although there is a lack of data in the literature with regards to the parental feedback response rates to the neonatal transport service, the general perception is that the response rates across the UK neonatal transport

teams are very poor. The aim of this survey was to determine the current parental feedback response rates and the various feedback practices adopted by the neonatal transport services across the UK.

MATERIALS AND METHODS

An electronic survey (email or online) request was sent to each of the UK neonatal transport teams. The individual response rates were categorised as very poor (< 25%), poor (25-50%), good (50-75%) and excellent (> 75%). The various feedback practices adopted by the teams (paper, email, online, mobile device etc.) were also noted. The results received from the transport teams were entered and analysed using a Microsoft® Excel® spreadsheet.

RESULTS

13/17 UK neonatal transport teams (76%) responded to the survey. The overall parent feedback response rates were “very poor” in 77% (10/13 teams) and “poor” in 15% (2/13 teams). One team did not formally request a feedback. None of the teams reported a response rate of > 50%. Self-addressed envelope made no difference to the paper feedback return rates. Paper based feedback was the method of feedback in 61% (8/13 teams) and email (email form/survey link) in 31% (4/13).

CONCLUSION

The parent feedback response rates in neonatal transport are generally poor across all the UK neonatal transport teams with none of the teams reporting rates > 50%. Paper and email are the two predominant feedback methods used. New methods of receiving feedback like tablet-based, Facebook and self-addressed postcard system need to be explored to improve response rates.

ABS 26

TABLET BASED FEEDBACK TO IMPROVE PARENT FEEDBACK RESPONSE RATES IN NEONATAL TRANSPORT – A QUALITY IMPROVEMENT STUDY

P. Bhat^{1,2}, C. Garland^{1,2}, A. Frame², G. Bullimore², L. Watts^{1,2}, C. Leach^{1,2}, C. Lawn^{1,2}

¹Royal Sussex County Hospital, Brighton, Sussex, UK

²Sussex Neonatal Transport Service, Brighton, Sussex, UK

INTRODUCTION

Poor parental feedback response rate in neonatal transport is a significant problem across all UK neonatal transport teams. A recent survey showed

that the parental feedback response rates was very poor (< 25%) amongst the neonatal transport services across the UK. Paper forms, email based questionnaire, online link to surveys etc. have been used but none of them have proven to be effective. The aim of this study was to establish if a tablet based feedback survey completed by parents during a transport event improved the feedback response rates in comparison to the paper and email forms.

MATERIALS AND METHODS

A prospective study of parental feedback to a regional transport service was undertaken over a six month period. Parents were given three options to choose from; the paper form, email form or a questionnaire on a tablet. The responses were excluded if parents weren't given the three options. A data enabled tablet with 4G connectivity was used which was then linked to the questionnaire on Google forms. Ethics approval was not needed but the study was approved by the trust's Information Governance Review Group.

RESULTS

Between January and April 2017, a total of 92 transfers were undertaken. Parental feedback was requested in 27 of those transfers (29% of all transfers). Two transfers were excluded. Of the three options, 80% (20/25) of the parents chose tablet and the remaining paper (20%) and no parent chose email. The response rate for tablet based feedback was 100%. The response rate for paper feedback was 20%.

CONCLUSION

Our study showed that the tablet based feedback was the preferred method of parental feedback when compared to the paper or email forms. The response rate for the tablet based survey was also much higher when compared to the paper forms (100% vs. 20%).

ABS 27

FAMILY CENTRED CARE IN NEONATAL TRANSPORT

J. Weddell, A. Jackson, S. Davidson, N. Gupta

Southampton Oxford Neonatal Transport Service, University Hospital Southampton NHS Trust, Southampton, UK

INTRODUCTION

The transport team has a crucial role in the initiation of Family Centered Care (FCC) for critically ill newborns. Despite evidence of the benefits,

there is variation in practice in neonatal transport. Southampton Oxford Neonatal Transport (SONeT) has set clear aims: parents are encouraged to discuss management, travel with their baby and are updated regularly. This study aims to explore the achievement of these standards.

MATERIALS AND METHODS

A prospective study between 1st August 2016 - 30th November 2016. Data was collected regarding communication and parental travel during neonatal transfers, including reasons why parents did not accompany the team.

RESULTS

During the study period, 220 transfers occurred with data collected for 180 (82%) transfers. Of these, 113 (63%) were planned and 67 (37%) unplanned transfers (BAPM standards: 40 ITU, 29 HDU and 111 SCBU). 57% were nurse led transfers. SONeT asked if a parent wanted to travel at the point of referral (86%) and asked parents at the referring unit in 140 (78%) transfers. Parents were unavailable in 36 (20%) cases. Parent information leaflets were provided in 71% of transfers and parents travelled with the team in 79 (44%) transfers (63 mother, 13 father and 3 both parents). In 42 (24%) mother was still an inpatient and therefore unable to travel. **Tab. 1** describes reasons for parents not travelling. Contact was documented as having been made with the family after transfer in 75% of transfers.

CONCLUSIONS

SONeT established communication with families throughout the process and parents travelled in the ambulance in almost half of transfers. We recognise that a significant number of parents are unable to travel with us and are offering a short video clip (via secure system) in addition to phone contact. We are currently piloting this in one hospital.

Table 1 (ABS 27). Reasons for parents not travelling with baby (n = 99 [56%]).

Reasons	Numbers (%)
Making their own arrangements	64 (36%)
Parents at home due to child care, twin	8 (4.5%)
Dad staying with mother	14 (7.8%)
Dad has to be at work	2 (1%)
Exhausted, want to rest	2 (1%)
Parents live near receiving centre	11 (6%)
Parents want to go home first before travelling to another hospital	8 (4.5%)
Financial hardships	2 (1%)

Not mutually exclusive reasons.

Human factors

ABS 28

BRAZILIAN REGULATION OF CHILDBIRTH IN TRANSPORT OF HIGH RISK INFANT IN A HOME CARE BIRTH SITUATION

C.V. Cupertino¹, S.A. Cupertino², A.V. Calado³, J.J.S. Silva³

¹University of Campinas (Unicamp), Campinas, Brazil

²University of São Paulo (Usp), São Paulo, Brazil

³College Processus, Brasília, Brazil

INTRODUCTION

Brazilian scenario in childbirth care has undergone major changes, facing an increase in demand for planned home births. Despite this fact, this type of assistance is not covered by Brazilian Health System (SUS), nor by complementary health plans. Therefore, there is no organized specific system for emergency transportation in such cases, which points out the need of a proper regulation in order to minimize the impacts due to complications in home setting.

MATERIALS AND METHODS

The methodology used is qualitative, exploratory and explanatory, based on bibliographic review in the subject of existing regulation of childbirth in transport of high risk infant in a home care birth situation.

RESULTS

In situations where transfer of newborn child is required, the general emergency transport regulations can be applied. Brazilian Federal Medical Council (Normative Resolution n° 2110/2014) ruled pre-hospital emergency mobile care system as a medical service; therefore, the assistance must be performed by a physician, with actions that enable diagnosis and treatment with immediate consequences.

However, it may be designed a proper regulation that includes the various categories of professional involved in the process of assistance, specific measures for an adequate care, and that promotes dissemination of information for involved parties, enabling the exercising of rights to a proper health care.

CONCLUSIONS

The transfer of the mother or the newborn requires a set of measures, such as stabilization of the patient,

provision of equipment and emergency medicine. The proper transportation carried out in emergency care in home deliveries guarantees the success in minimizing risks. The need of a specific regulation of this type of situation is going to increase in the next years due the growth of the number of deliveries carried out in this setting.

Research and quality indicators

ABS 29

INFANTS REFERRED FOR THERAPEUTIC HYPOTHERMIA: QUALITY OF NEUROLOGICAL ASSESSMENT AND DOCUMENTATION

N. Goel¹, A. De Cunto¹, S. Mohinuddin¹, N. Ratnavel¹, M. Kumarasamy¹, A. Sinha^{2,3}

¹Neonatal Transfer Service, Barts Health NHS Trust, Whitechapel, London, UK

²Department of Neonatal Medicine, Barts Health NHS Trust, Whitechapel, London, UK

³Blizard Institute, Queen Mary School of Medicine and Dentistry, University of London, UK

INTRODUCTION

The major cooling trials had specific criteria to select infants with moderate-severe encephalopathy. This study aims to assess the completeness of neurological assessment documentation for referring infants for hypothermia and to compare the examination findings with trials criteria.

MATERIALS AND METHODS

Two cohorts of infants referred for retrieval to the London Neonatal Transfer Service from July 2011 to June 2013 and July 2014 to June 2015 were included. Case records were retrospectively reviewed.

RESULTS

Data was available on 266 infants, 145 in the first and 121 in the second period respectively. Assessment was sufficiently complete to allow the matching with TOBY and NICHD criteria in 62/145 (42.7%) infants in the first period and 42/121 (34.7%) and 49/121 (40.4%) in the second. When measured against the TOBY criteria, 32/62 (51.6%) infants in the first group and 20/42 (47.6%) in the second fulfilled the criteria. When measured against the NICHD criteria, 28/62 (45.2%) in the first group

and 21/49 (42.9%) in the second met the minimum three of the six categories required.

CONCLUSIONS

In more than a third of referrals, the documentation of neurological assessment was not sufficiently complete. The majority of the babies with complete documentation did not fulfil the trials criteria.

ABS 30

COSYPOD – BRINGING BABIES BACK BETTER

J. Grant-Thomson

Private consultant

INTRODUCTION

Thousands of newborns are retrieved and transported by road and air at regular intervals each month across the world. Some are critically-ill and require specialist care and systems providing intensive-care conditions to sustain life during the transport. The retrieval teams usually collect the newborn from a referring hospital, provide appropriate transport and admit the neonate to a specialist hospital. In many cases, due to the level of specialist management, the neonate often recovers sufficiently to no longer require intensive-care and could be returned under medium-care to the referring hospital. This presentation describes a medical device (Cosypod), capable of providing such medium-care conditions.

MATERIALS AND METHODS

Many hospitals and retrieval organisations currently use medical devices originally designed for intensive-care transportation to provide medium-care for such back-transfers. Using intensive-care transport systems for back-transfers is not cost effective and in many cases is usually more cumbersome and heavier than a bespoke system. Following extensive consultations with many retrieval teams both nationally and internationally, a specification for an “ideal” back-transfer system was described and, through an iterative process, a practical design was developed. Trials were conducted at major hospitals to prove the efficacy of the system.

RESULTS

Information was collected on features such as access to the infant, temperature control, physiological monitoring, application of drug therapy, oxygen therapy, overall weight of the system and ease of loading and unloading in road ambulances and aircraft.

CONCLUSIONS

It was concluded that the system performed well according to its specifications. No specific problems were encountered which couldn't be corrected. It was clear that two main advantages were identified in that firstly, its medium care capability allowed infants to be transported efficiently back to their referring hospital and family earlier in one transport and secondly, it vacated an intensive-care bed in the specialist hospital.

ABS 31

BORN BEFORE ARRIVAL, BORN TOO SOON

R.A. Boland^{1,2,3}, P.G. Davis^{2,4}, J.A. Dawson^{1,2,4}, M.A. Davey⁵, L. William Doyle^{1,2,4}

¹Clinical Sciences, Murdoch Childrens Research Institute, Parkville, Australia

²Department of Obstetrics and Gynaecology, University of Melbourne, Parkville, Australia

³Pediatric Infant Perinatal Emergency Retrieval, Royal Children's Hospital, Parkville, Australia

⁴Newborn Research Centre, The Royal Women's Hospital, Parkville, Australia

⁵Clinical Councils Unit, Department of Health and Human Services, Melbourne, Australia

INTRODUCTION

Birth before arrival (BBA) at a hospital is a relatively rare event, reported at rates of 0.4% of all births in Australia. However, compared with birth in a hospital, unintentional birth before arrival is associated with increased risks of mortality and morbidity, even at term gestation. Our aims were to report: 1) perinatal characteristics of very preterm BBAs, and 2) perinatal and infant mortality data up to one year, comparing BBAs with very preterm births in a hospital.

MATERIALS AND METHODS

We conducted a population-based study of all births at 22-31 weeks' gestation in the state of Victoria, Australia in 1990-2009. BBA was defined as unintentional birth at home, or in transit to hospital, in a motor vehicle or ambulance. The Department of Health and Human Services, Victoria provided perinatal data. We analysed perinatal and infant mortality data comparing BBAs with births in hospitals by logistic regression, adjusted for gestational age, birthweight and sex.

RESULTS

Of 16,910 recorded births, 133 (0.8%) were BBAs. There were 51 (38%) stillbirths and 82 (62%) livebirths. Compared with hospital births, BBAs were

less mature (26.3 weeks [SD 2.9] versus 27.7 weeks [SD 2.8]), $p < 0.001$). Higher proportions were born to teenagers: 13% versus 5% (adjusted Odds Ratio [aOR] 2.86, $p < 0.001$). BBAs were significantly more likely to be stillborn (aOR 2.13, 95% confidence interval [CI] 1.41, 3.23, $p < 0.001$) die within 28 days of livebirth (aOR 2.97, 95% CI 1.54, 5.73, $p = 0.001$) or die within a year of livebirth (aOR 2.87, 95% CI 1.51, 5.46, $p = 0.001$) compared with hospital births. Overall, 54 BBAs survived to one year (41% of all BBAs, 67% of liveborn BBAs), compared with 69% of hospital births (87% of live births).

CONCLUSIONS

Very preterm birth before arrival was associated with significantly increased risks of stillbirth, neonatal mortality and infant mortality compared with birth in a hospital.

ABS 32

TRANSPORT RISK INDEX OF PHYSIOLOGIC STABILITY: A VALIDATION FOR SWEDISH CONDITIONS

B-M. Karlsson, J. Berg

Clinical Sciences, Pediatrics, Umeå University, Umeå, Sweden

INTRODUCTION

Scoring instruments for neonatal transports are available. The neonatal transport team (NTT) at Umeå University hospital has used the Transport Risk Index of Physiologic Stability (TRIPS), developed in North America, for both planned and emergency neonatal transports since 2004. The aim of this study was to describe and validate TRIPS for neonatal emergency transports in Sweden.

MATERIALS AND METHODS

From January 1st 2004 to December 31st 2016, altogether 1,679 neonatal transports were performed, of which 536 transport met the inclusion criteria. TRIPS, TRIPS II and California TRIPS (CaTRIPS) were calculated for all transports using data from the transport journal.

RESULTS

We calculated ROC curve C-statistics from our data and obtained values of 0.8, 0.77, 0.76, 0.8 and 0.78 from TRIPS score before transport, TRIPS score after transport, CaTRIPS score before transport, CaTRIPS score after transport and TRIPS II, respectively. Hosmer-Lemeshow goodness of fit statistics were not significant, indicating that there is no difference between observed and expected 7-day mortality.

CONCLUSIONS

TRIPS can be used as a risk assessment tool of infants during neonatal transport in Sweden. However, the TRIPS instrument seems to be relatively imprecise and its accuracy might improve by adding more variables into the scoring system.

ABS 33**EVALUATION OF COST OF NEONATAL TRANSPORT ORGANIZATION IN LIGURIA REGION, ITALY**

C. Bellini¹, M. Pasquarella², L. A. Ramenghi¹, D. Ambrosino², A.F. Sciomachen²

¹Neonatal Intensive Care Unit, Neonatal Emergency Transport Service, IRCCS Istituto Giannina Gaslini, Genoa, Italy

²Department of Economics and Business Studies, University of Genoa, Genoa, Italy

INTRODUCTION

Since 1978, the Italian government has run a universal public healthcare system which is overseen by the Ministry of Health, though run on a regional basis. Each regional government is therefore responsible for organizing its healthcare system. Neonatal Emergency Transport Service (NETS), is currently under regional control and organization. The aims of the study were: to establish the cost-effectiveness of a “hub-and-spoke” transportation network system of on-call NETS; to compare costs reported by various Italian NETS; to establish the financial needs in order to improve the NETS organization within Italy.

MATERIALS AND METHODS

We evaluated and analysed the costs of running the NETS in Liguria region, Italy between 2012 and 2015 (included).

RESULTS

We calculated all the costs related to our NETS and determined that between 200 and 350 transports per year is the optimal amount of activity to achieve good financial performance and to acquire a suitable personnel skill set.

CONCLUSIONS

Although the “hub and spoke” transport network is conceptually valid, our research showed that the Italian healthcare system organization of perinatal care, and in particular of NETS, is expensive and is currently no longer sustainable in this era of limited financial resources, thereby urgently requiring a complete overhaul.

NOTE

This abstract is derived from a Bachelor’s Degree Thesis in Economics (M.P.) entitled “*Analysis of Costs of Neonatal Transport Service of the Liguria Region*”, presented in July 2016, University of Genoa, Italy.

ABS 34**THE EFFECTS OF SHORT TERM WHOLE BODY VIBRATION, AS EXPERIENCED DURING NEONATAL AMBULANCE TRANSPORTATION, ON THE EARLY DEVELOPING RODENT BRAIN**

L. Shipley, I. Bloor, D. Sharkey

Academic Child Health, University of Nottingham, Nottingham, UK

INTRODUCTION

Neonatal transport can expose the fragile preterm infant to excessive whole body vibration (WBV) and is associated with worse neurological outcomes including intraventricular haemorrhage. Chronic WBV exposure is associated with neuronal injury, such as cerebral oedema and glial cell proliferation and enlargement. We aimed to evaluate the effect of a single, short term WBV exposure, equivalent to that experienced by a neonate during an ambulance transfer, on the neonatal brain using a relevant rodent model.

MATERIALS AND METHODS

Thirty-two Sprague-Dawley rats were randomly divided into control (C) and vibration (V) groups (n = 8) at postnatal days 7 and 21 (equivalent to 32 wk and post-term human newborn for brain anatomy). V groups were exposed to 2 m/s² WBV for 90 minutes. Animals were euthanised at 24 hours post exposure and brain tissue fixed for histopathological evaluation of the cortex (6 samples/animal). Blinded quantification of the neuronal oedema (white space surrounding cells) and area of glial cells were calculated using microscopy and Image-Pro® software. Data were analysed using Mann-Whitney.

RESULTS

The day 7 V group had a significantly higher area of neuronal oedema (3,353 mm² vs 1,584 mm², p = 0.01) and glial cells (2,621 mm² vs 1,427 mm², p = 0.002) compared to Cs. Day 21 groups did not show a significant difference in neuronal oedema (2,621 mm² vs 1,427 mm², p = 0.32) but did show increased area of glial cells in the V group (2,411 mm² vs 1,921 mm², p = 0.03). Overall, day 7 V group had a significantly higher percentage increase from C for neuronal oedema (137% vs 21%) and

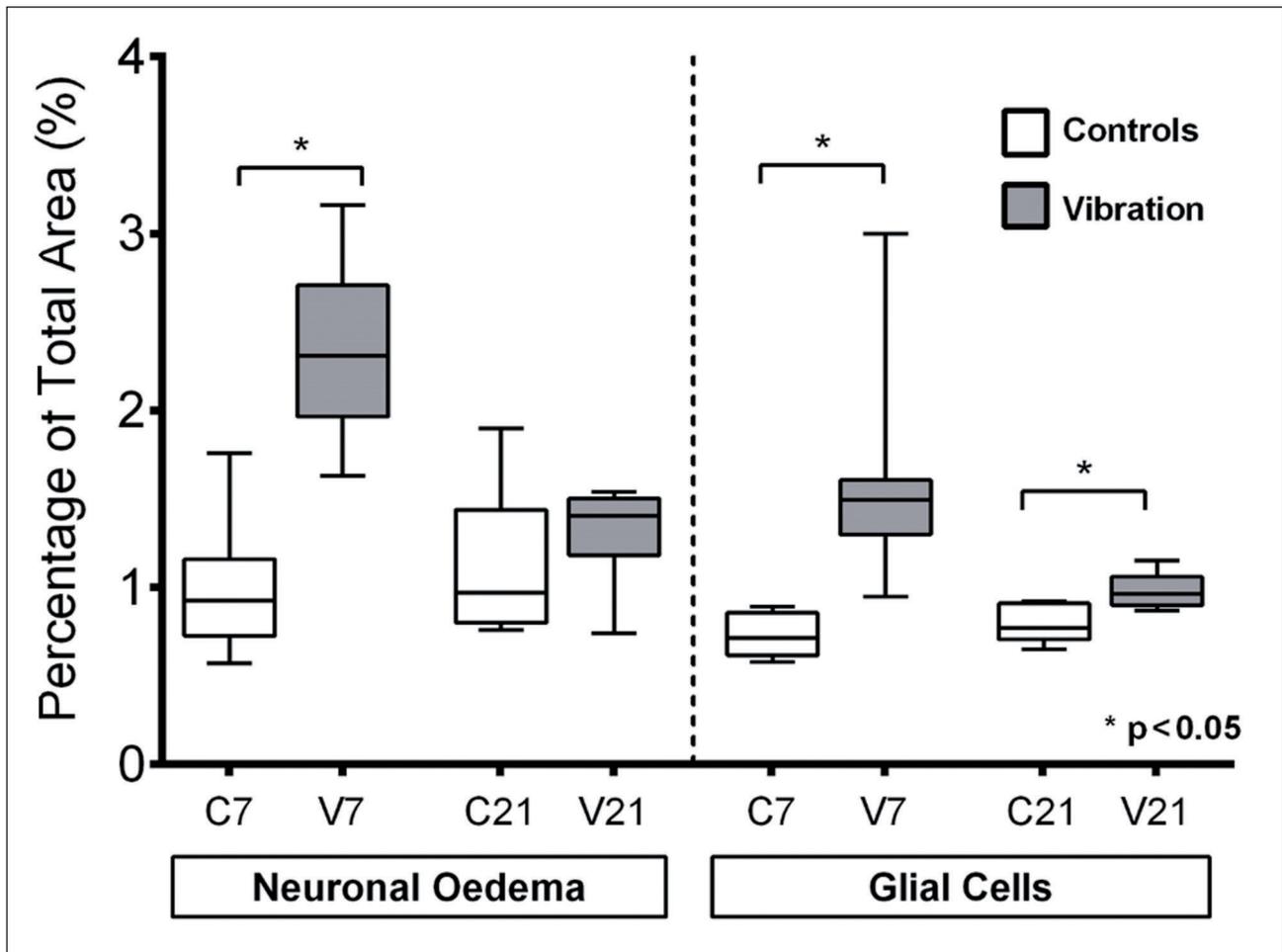


Figure 1 (ABS 34). Comparison of percentage area of neuronal oedema and glial cells between D7 and D21 rodents.

glial cells (119% vs 22%) compared to day 21 V groups (**Fig. 1**).

CONCLUSIONS

This new animal model of neonatal short term WBV is associated with an acute brain injury with resulting neuronal oedema and reactive cellular response which appears greater with increasing immaturity. This microscopic brain injury could potentially impact on long-term neurodevelopment in high-risk transported infants.

ABS 35

TRANSPORT RISK INDEX OF PHYSIOLOGICAL STABILITY (TRIPS): VALIDATING TRIPS FOR UK REGIONAL NEONATAL TRANSFER SERVICE

L. Sasidharan, S. Sampath, K. Patston, N. Ratnavel, A. Sinha, S. Mohinuddin, C. King

London Neonatal Transfer Service, Royal London Hospital, Barts Health NHS Trust, London, UK

INTRODUCTION

Transport Risk Index of Physiological Stability (TRIPS) scoring is a validated triage tool used by several transport teams internationally. London Neonatal Transfer Service covers 29 neonatal units within the 3 London neonatal networks and does not currently use a triage tool. Currently the triage process is subjective and based on clinical needs and local information. Aims: to validate TRIPS score for UK Regional Neonatal Transfer Service.

MATERIALS AND METHODS

Retrospective review of all emergency uplift transfers between April 2015 and September 2015. Data on patient demographics and physiological variables for TRIPS were collected from case notes and transport database (**Tab. 1**). Outcome data was recorded at discharge from hospital. Study was approved by Barts Health Clinical Effectiveness unit.

RESULTS

Total 599 emergency transfers; 38 babies who did not meet criteria were excluded. Complete data

Table 1 (ABS 35). Gestational age, birth weight and TRIPS score in survivors and non-survivors.

	Survivors (n = 506)	Non-survivors (n = 54)	p-value ^a
Gestational age (weeks)	36.1 (28.3-40.0)	36.9 (28.3-39.0)	0.4
Birth weight (kg)	2.38 (0.99-3.331)	2.36 (0.82-3.12)	0.3
TRIPS score	21 (3-38)	36 (20-43)	0.001

Data as median (IQR).

^aMann-Whitney U test.

TRIPS: Transport Risk Index of Physiological Stability.

available for 511 babies at first assessment. There were 90 cases of National Time Critical transfers: respiratory failure (66), intestinal perforation (13), gastroschisis (7), cardiac (2) and ventilated TOF (2). TRIPS variables and survival outcome: outcome of non-survival was significantly associated with respiratory status categories ($p = 0.02$) temperature categories ($p = 0.02$) and responsiveness categories ($p < 0.001$) but not with systolic BP categories ($p = 0.9$) and inotrope categories ($p = 0.06$).

ROC curve of TRIPS score had an AUC (95%CI) of 0.64 (0.57-0.72) for prediction of non-survivor. A TRIP cut-off score of 25 had a sensitivity of 65% and specificity of 55% for outcome.

CONCLUSIONS

While TRIPS scores were higher amongst non-survivors, any cut-off point of TRIPS score to predict non-survivors had modest sensitivity and specificity. This score may not be directly applicable as a triage tool to our service.

ABS 36

PREDICTIVE MODEL TO ANTICIPATE THE NEED OF MAJOR MEDICAL INTERVENTIONS BY SPECIALIZED NEWBORN TRANSPORT TEAM

I. Marsinyach Ros¹, L. Sánchez García², M. Pérez Grande³, A. Sánchez Torres², R. Mosqueda Peña³, M.J. Rodríguez Castaño⁴, D. Elorza Fernández²

¹Hospital General Universitario Gregorio Marañón, Madrid, Spain

²Hospital Universitario La Paz, Madrid, Spain

³Hospital Universitario 12 De Octubre, Madrid, Spain

⁴Hospital Clínico San Carlos, Madrid, Spain

INTRODUCTION

Preliminary data about risk factors, before the beginning of a newborn transport, may anticipate

the requirement of major medical interventions during the stabilization process by the specialized transport team. This information may facilitate triage and speed up the team deployment. The aim of this study is to evaluate a possible predictive model of the requirement of medical procedures during newborn stabilization.

METHODS

A retrospective cohort study was conducted in our region in 2009-2015. All emergent newborn transports were included. Subjects were grouped in two categories whether they had needed major medical interventions or not. Variables of theoretical interest related to the outcome were analysed. Multivariate logistical regression was performed to construct a predictive model to anticipate the need of medical interventions using forward stepwise computer driven procedures (Stata/IC 14.2 software, StataCorp LP, College Station, TX).

RESULTS

A total of 2,414 newborn transports were performed, 71% ($n = 1,685$) were urgent. The proportion of transports that needed a major intervention was steady through the study period (average of 16.82%, Chi square $p = 0.163$). Patient characteristics are summarized in **Tab. 1**. Patients who required interventions during transport had significantly lower postnatal age and were significantly more likely to be transported during night shift and from a level II referral hospital. A predictive model was constructed, after adjustment for potential confounding factors, consisting on 4 selected variables (gestational age, hypoxic-ischemic encephalopathy, respiratory diseases and age above 7 postnatal days) with a predictive value assessed with an area under ROC curve of 0.692 (CI 95%: 0.66-0.72).

CONCLUSIONS

Previous information, before the newborn transport process is initiated, may be helpful in the triage as it may anticipate which transports are susceptible of requiring major medical interventions by the transport team, and so would benefit of a rapid team deployment.

ABS 37

QUALITY OF NEONATAL TRANSPORT PERFORMED BY A SPECIALISED COMBINED NEONATAL AND PEDIATRIC TRANSPORT UNIT IN CATALONIA (SPAIN)

O. Rodríguez, T. Esclapés, A. Gallardo, M. Pardo, L. Subirana, P. Domínguez

Table 1 (ABS 36). Baseline patient characteristics.

	Major medical intervention by transport team		
	Yes	No	p (significance level)
Female Absolut count (%)	165/403 (40.9)	835/1,996 (41.6)	NS
GA (weeks) Mean (SD)	35.8 (4.56)	35.8 (4.80)	NS
Postnatal days Mean (SD)	9.70 (16.59)	14.28 (18.65)	p < 0.0001
Age < 7 days Absolute count (%)	255/406 (52.4)	908/2,008 (45.2)	p < 0.0001
Weight (grams) Mean (SD)	2,800 (1,171)	2,273 (1,162)	NS
Referral hospital level II Absolut count (%)	214/406 (44)	796/2,006 (39.6)	p < 0.0001
Night shift Absolut count (%)	134/341 (39.2)	493/1,574 (31.3)	p = 0.002
Axillary temperature ^a on contact at referral hospital (°C) Mean (SD)	35.88 (2.59)	36.59 (9.14)	p = 0.027
Mean arterial pressure on contact at referral hospital (mmHg) Mean (SD)	47.01 (12.69)	52.27 (12.38)	p < 0.0001
Heart rate on contact at referral hospital (bpm) Mean (SD)	150.46 (28.56)	144.18 (21.54)	p = 0.0001
Oxygen saturation (%) Mean (SD)	93.11 (10.04)	96.80 (4.61)	p < 0.0001
Invasive ventilation Absolut count (%)	251/365 (68)	256/1,320 (19.4)	p = 0.0001
Inotropic support Absolut count (%)	156/365 (42.7)	98/1,320 (7.4)	p < 0.0001

^a Patients affected by HIE excluded.

HIE: hypoxic-ischemic encephalopathy; GA: gestational age; NS: non-significant; SD: standard deviation; bpm: beats per minute.

Pediatric Transport Unit (SEMPVH), Vall d'Hebron University Hospital, Barcelona, Spain

INTRODUCTION

Quality indicators need to be evaluated in order to improve neonatal transport. The aim of this review is to analyse the quality of neonatal transport carried out by SEM-Pediatric Vall D'Hebron (SEMPVH).

MATERIALS AND METHODS

Review of the specific registry of neonatal patients (< 1 month) transported during 2016 by SEMPVH.

RESULTS

Neonates transferred: 219; 82% in the first 24 hours of life; mostly respiratory problems. Mean birth weight: 2,713 g. Prematures: 37%. Mean mobilization/stabilization time: 7.5/60 min. Median Transport Risk Index of Physiological Stability (TRIPS) score on arrival at the referral hospital: 6 (0-65; lack of data in 15%). 32% of patients transferred intubated (20% of intubations by SEMPVH). Confirmation of tracheal tube placement: 83% of cases. Three accidental

extubations occurred (4.2%; a rate higher than usual). Hypoxemia during transport: 6.8%. Central venous catheter: 39% (X-ray verification: 89%); no vascular access lost. One unplanned dislodgement of a chest tube. Hypotension during transport: 7.3%. Only in 41% of patients the admission temperature at destination was recorded; 33% had unintended hypothermia; temperature < 36°C: only 11%. Blood glucose check: 80% of patients; hypoglycemia (< 45 mg/dL): 5%. CPR was initiated or continued by SEMPVH in 2 patients, eventually resuscitated. No medication errors were detected. Equipment failure occurred in 2 cases (0.9%). No death occurred during transport (from arrival at the referral hospital to one hour after admission).

CONCLUSIONS

The reported data show the complexity and high risk character of neonatal transport. Evaluation of specific indicators offers opportunities to detect weaknesses in the process (in our case, accidental extubation and record and control of patient's temperature) and

allows for benchmarking. However, lack of clear definitions for some metrics should be considered, as for the transport related mortality indicator.

ABS 38

MATERNAL ASSISTED TRANSPORT SYSTEM: HOW EFFECTIVE ARE WE? – COMPARISON BETWEEN NEW SOUTH WALES AND THE AUSTRALIAN CAPITAL TERRITORY AND NORTHERN LOMBARDY

M. Betti¹, E. Ferrario¹, P. Tagliabue², T. Fedeli², R. Tironi³, R. Bellù⁴, A. Pellegrino³, P. Vergani¹

¹Department of Obstetrics and Gynaecology, Fondazione MBBM, ASST Monza, University of Milano-Bicocca, Milan, Italy

²Neonatology and Neonatal Intensive Care Unit, MBBM Foundation, ASST Monza, University of Milano-Bicocca, Milan, Italy

³Department of Obstetrics and Gynaecology, ASST Lecco, Alessandro Manzoni Hospital, Lecco, Italy

⁴Neonatology and Neonatal Intensive Care Unit, ASST Lecco, Alessandro Manzoni Hospital, Lecco, Italy

INTRODUCTION

Since its start, the regionalization has been set up focusing almost entirely on newborns, while

maternal sides have been less considered. In 2011 Lombardy's administration and Italian Ministry of Health provided a grant to support a pilot project to reorganize perinatal care in our two provinces: Monza and Brianza (MB) and Lecco (LC). So far the system has fulfilled 521 *in utero* transports to tertiary centres (Fig. 1): 64.5% for threatened preterm labour (TPL)/premature rupture of membranes (PROM), 20.7% for pregnancy-induced hypertension (PIH) including intra-uterine growth restriction (IUGR), 8.1% for antepartum haemorrhage (APH) and 6.3% for other conditions. Mean gestational age at transfer was 29.4 weeks, delivery at receiving hospital occurred in 51.0% with a mean latency of 3.5 days. Neither delivery nor complication happened during transfers. The study aims to compare the maternal outcomes between our pilot system and "The High-Risk Obstetric Transfer Study", which is, to our knowledge, the widest series in the literature.

MATERIAL AND METHODS

We collected all antenatal referrals from April 2011 to December 2016 (total 521). We then analysed our data according to the categories in "The High-Risk Obstetric Transfer Study", which examined the obstetric transfers to tertiary centres across New South Wales (NSW) and the Australian Capital Territory (ACT) from 2010 to 2011 (total 249).

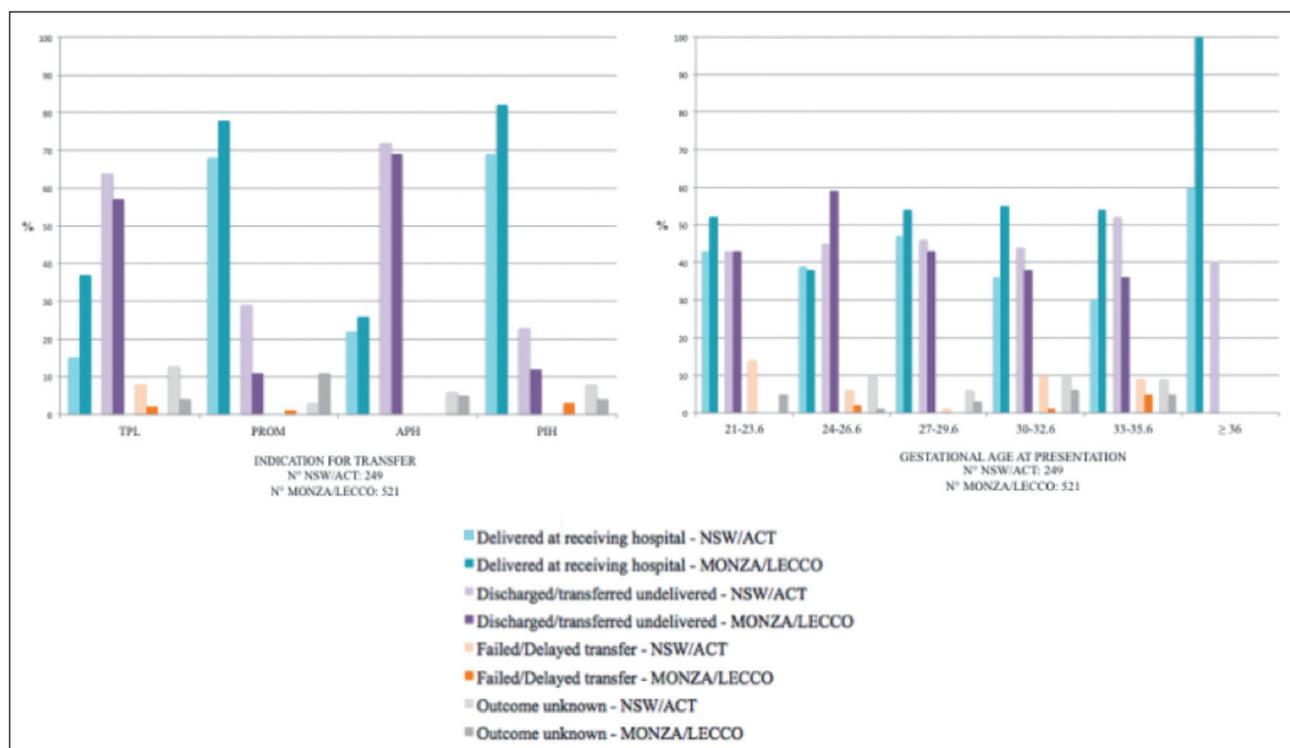


Figure 1 (ABS 38). Indication for transfer and gestational age at presentation.

TPL: threatened preterm labour; PROM: premature rupture of membranes; APH: antepartum haemorrhage; PIH: pregnancy-induced hypertension; NSW: New South Wales; ACT: Australian Capital Territory.

RESULTS

For each indication category, our percentage of transfers resulting in delivering at receiving hospitals was higher and this remained true even through all gestational ages. Likewise, we discharged fewer patients undelivered, except for < 27 weeks. We also had fewer failed transfer. The discrepancy might be partially due to geographical reasons (NSW + ACT area 811,802 km² versus MB + LC 3,819). Lastly, our delivery rate at receiving hospital was within the upper range available in the literature (46-72.5%).

CONCLUSIONS

We proved our pilot system to be successful.

Transport teams

ABS 39

IMPROVING MOBILISATION DECISION PROCESS USING A CALL HANDLING ALGORITHM

J. Samara, R. Paul, A. Elsharkawy, A. Abou Mehrem, S. Thomas

Southern Alberta Neonatal Transport Services (SANTS), University of Calgary, Alberta Health Services, Health Quality Council of Alberta (HQCA), Calgary, Alberta, Canada

INTRODUCTION

Effective communication and time management are essential for timely mobilisation of transport teams. The objective of this quality improvement initiative was to identify causes of delay in mobilisation decision and to create an algorithm to support mobilisation decision-making. Mobilisation time was calculated from the time the referring physician started presenting the case until transport physician decided to mobilise the team, and a goal of 3 minutes was targeted.

MATERIAL AND METHODS

Voice recorded transport calls and charts for newborns referred to Southern Alberta Neonatal Transport Services (SANTS) between January and July 2016 were audited retrospectively to evaluate the process of initiating transport team mobilisation. Based on audit findings, a call handling algorithm was developed. A post-implementation audit was performed after a washout period of 4 months. Descriptive statistics and qualitative data analysis are presented.

RESULTS

Pre-implementation audit: 41 transport calls were audited; median (IQR) mobilisation time was 03:30 (02:17-05:45) min, and the decision to mobilize the team was made after 3 min of starting the call in 24 (59%) cases. Cases reviewed included patients with prematurity, respiratory distress requiring

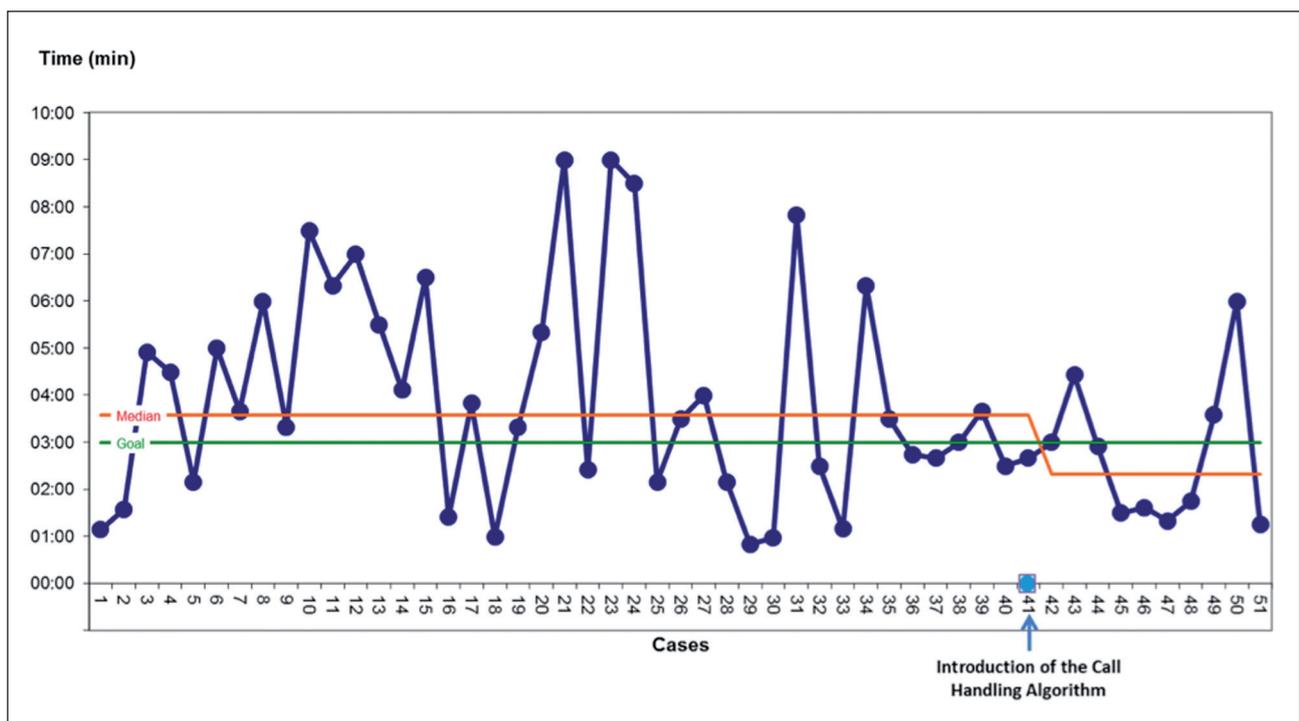


Figure 1 (ABS 39). Time to mobilisation decision.

respiratory support, surgical cases, hypoxic ischemic encephalopathy and sepsis. Qualitative analysis revealed that 2 themes contributed to delaying mobilisation, taking detailed history prior to making mobilisation decision, and repetition of history taking when multiple stakeholders joined the call at different times.

Post-implementation of call handling algorithm: 10 transport calls were audited; median (IQR) mobilisation time was decreased to 02:20 (01:28-03:48) min, and the decision to mobilize the team was made after 3 min of starting the call in 3 (30%) cases. Cases were similar to the first audit. Run chart is presented (Fig. 1).

CONCLUSIONS

Neonatal transport team mobilisation decision-making can be expedited using call handling algorithms based on the operational structure of the clinical network.

ABS 40

CHALLENGES OF A NEONATAL EMERGENCY & TRANSPORT SERVICE IN CENTRAL HUNGARY

Zs. Somogyvari, A. Szell, A. Berenyi

Neonatal Emergency & Transport Service of the Peter Cerny Foundation (NETS-PCA) Budapest, Hungary

INTRODUCTION

28 years ago in Hungary, prematurity rate was 8-9% and perinatal mortality rate was 1.5-2%. Although a NICU network had been in place, sick neonates were transferred in non-specialised ambulances. Mortality rate of ventilated patients transferred *ex-utero* was twofold compared to inborn babies.

MATERIAL AND METHODS

Organizing a “two ways transport system” solved our initial challenges, including the lack of equipment, experience, assisting ongoing resuscitations in referring hospitals, legislation, financing of a NGO performing emergency transfers. We answered for ongoing challenges, including fragmentation of NICU network and the occurrence of simultaneous callings. We have to draw a balance by adopting new approaches but preventing the premature use of un-established therapies, handling out-of-hospital emergencies and reducing unnecessary transfers by using telemedicine. We ensured sustainable budget by national contract and fundraising.

RESULTS

Neonatal Emergency & Transport Service of the Peter Cerny Foundation (NETS-PCA) covers the central region of Hungary, its surrounding area with ~140 km radius and a population of 4 million. The region has 11 level 3 NICUs, 31 local hospitals, 10 diagnostic centers. We provide transport for babies less than 6 kg and/or 60 cm irrespective of their age. Over the 28-year period > 73,000 sick newborns were transported, of them > 15,000 required ventilation support. We also attended resuscitation on delivery units and at home deliveries. More recently, we performed > 250 transfers with active controlled hypothermia. We have implemented a bedside ROP screening using a RetCam + telemetry (> 8,000 cases) and addressed the post-discharge prehospital emergency care (> 2,500 cases). NETS-PCA has contributed to the reduction of perinatal mortality rate to 0.39% in Hungary by 2016.

CONCLUSIONS

Dedicated neonatal inter-facility transport service tailored to the specific needs and resources of the central region of Hungary is capable to solve the challenges of optimal neonatal transport.

ABS 41

INTERHOSPITAL TRANSPORT OF PEDIATRIC PATIENTS IN DENMARK – A SURVEY OF CURRENT PRACTICE

K. Nystrup¹, P. Poorisrisak², M. Breindahl^{2,3}, P. Hallas^{1,4}

¹*Juliane Marie Centre – Anaesthesia and Surgical Clinic Department 4013, Rigshospitalet, Copenhagen University Hospital, Copenhagen, Denmark*

²*Department of Neonatology, Rigshospitalet, Copenhagen University Hospital, Copenhagen, Denmark*

³*Department of Neonatology, Karolinska University Hospitals in Danderyd, Solna and Huddinge, Stockholm, Sweden*

⁴*Department of Emergency Medicine, Zealand University Hospital, Køge, Denmark*

INTRODUCTION

No national guidelines exist in Denmark regarding interhospital transport of critically ill children. The aim of this study was to disclose which physicians actually accompany critically ill children during interhospital transports nationwide and whether the physicians have adequate clinical skills to perform interhospital transfers.

MATERIALS AND METHODS

A questionnaire sent to the youngest pediatrician on-call at every hospital in Denmark receiving pediatric

emergencies except the tertiary Copenhagen University Hospital, Rigshospitalet.

RESULTS

Seventeen pediatric departments were contacted, response rate 100%. All departments indicated that they perform interhospital transport of pediatric patients.

When presented with 5 cases, great heterogeneity in the choice of transport physician and accompanying staff was seen. With increasing severity, fewer pediatricians were willing to transport the children (24% vs 6%). Irrespective of the degree of severity, more transports were delegated to anaesthesiologists than performed by pediatricians.

Pediatricians who agreed to transport the neonatal cases had adequate competencies. In cases with

older children, 0 to 75% of physicians who would do the transport had adequate clinical skills and experience in emergency pediatric respiratory and cardiovascular management.

Training in interhospital transport was offered by one department, six departments (35%) had local guidelines describing the management of pediatric transports.

CONCLUSIONS

Great heterogeneity was found in the local transport strategies and practical skill sets of accompanying physicians. Overall, there is room for improvement in the management of interhospital transport of critically ill children in Denmark, perhaps by increasing the availability of specialized pediatric transport services for critically ill children nationwide.