



Best Practice Guideline article

Safety and governance issues for neonatal transport services

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ABSTRACT

Neonatal transport is a subspecialty within the field of neonatology. Transport services are developing rapidly in the United Kingdom (UK) with network demographics and funding patterns leading to a broad spectrum of service provision.

Applying principles of clinical governance and safety to such a diverse landscape of transport services is challenging but finally receiving much needed attention.

To understand issues of risk management associated with this branch of retrieval medicine one needs to look at the infrastructure of transport teams, arrangements for governance, risk identification, incident reporting, feedback and learning from experience. One also needs to look at audit processes, training, communication and ways of team working.

Adherence to current recommendations for equipment and vehicle design are vital.

The national picture for neonatal transport is evolving. This is an excellent time to start benchmarking and sharing best practice with a view to optimising safety and reducing risk.

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1. Introduction

Infant transport, either as a primary response episode or as part of an inter-hospital process has been carried out for as long as there have been neonatal healthcare facilities.

Developments in the provision of neonatal and paediatric intensive care driven largely by doctors and nurses who recognised the need for such services and who harboured the desire to specialise in these areas have resulted in enormous growth in these fields.

Associated with this has been a huge increase in knowledge and capability. The last 20 years has seen a marked change in the boundaries that previously limited the delivery of neonatal medicine.

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Structured training in neonatology is under sharp focus. In order to care for critically ill babies it is an absolute requirement to have ownership of the specific knowledge base & have achieved an acceptable level of competency with regard to practical procedures involving neonatal patients and the complex communication involved with supporting their parents.

Whilst we have been getting better at caring for these vulnerable patients the areas of clinical governance and formal risk management have taken shape. When it comes to patient and staff safety we must adopt a forward thinking and proactive approach.

Finally, on the background of all of this we are seeing a surge in the development of neonatal transport services across the United Kingdom. Applying the principles of governance and safety to this new subspecialty is essential if we are not to find ourselves and our patients exposed to unnecessary and adverse outcomes.

2. Patterns of risk

Adverse events can easily occur during the inter-hospital transfer of ill children for intensive care [1]. The same can be said of the critically unwell baby. For years, neonatal transfers have been organised in a rather ad-hoc and reactive manner. Patterns of communication were unrehearsed. Arrangements with ambulance services were associated with conflicts of interests. Medical and nursing staff were not formally trained for this activity, equipment familiarity was suboptimal and proactive assessment of risk was not the norm. Where are we now with these issues? We have a long way to go but it is fair to say that we have come a long way too.

Dedicated neonatal transport teams have developed rapidly across the UK in the last 10 years. Patterns of service delivery vary markedly. The major influences on this are local demographics and budgetary capacity. Some regions may have a continuous, 24 h service. There may be areas that have day time only services with either no or partial night time provision. There are also regions that have no dedicated service at all. The Department of Health Neonatal Intensive Care Review 2003 recommended the placement of specialist transfer services and that the staffing arrangements for these should be separate from the clinical inpatient workforce in each network. Thus the care of babies is not compromised by lack of staff availability [2]. This is clearly not the case across the country with only half of the networks providing specialist neonatal transport 24 h a day, 7 days a week as outlined in the National Audit Office Report 2007 [3]. The majority of teams are staffed by neonatal specialists. A few have combined teams providing both neonatal and paediatric transport. The ability to identify risk and minimise it across this wide variety of service type has its challenges. There is much less uniformity between transport teams than exists between equivalent neonatal units.

Lim and Ratnavel concluded that adverse events can occur commonly during neonatal transfer and that early identification of potentially harmful episodes is important [4]. In this way we can reduce the number of these through education, training and risk management. In order to identify the key issues such that we can minimise risk and optimise safety we need to break down the nature of transporting neonates into its component parts. Some of the areas for focussed thinking are very broad issues related to infrastructure and logistics whilst some relate to clinical management and are highly situational and specific.

3. Strategies for risk reduction

3.1. Teams

Ideally, these should be dedicated which means allocated specifically for patient transport. This ensures a rapid, timely team dispatch and a patient focussed response to emergency requests for transfer. Kempley et al showed that following the introduction of a

centralised neonatal transfer service response times improved significantly [5]. Having a stand-alone team also enhances familiarity with transport specific processes and equipment. Clearly this set-up is expensive and may not be affordable if transfer numbers are low. Having some but not all of these elements may be cheaper but may compromise speed of response.

3.2. Ambulance services

The UK Ambulance Service Association that oversees and provides guidance and support to all ambulance trusts at a national level have identified the dangers associated with the frontline emergency transport of babies and children in terms of organisation, protocols, equipment, vehicles, personnel and communication.

Embracing local ambulance services into the infrastructure of a regional transport team is essential if one is to minimise time delays, maximise knowledge of the transport environment and push forward boundaries in terms of vehicle and equipment design. It improves medical and nursing staff appreciation of ambulance service priorities, increases the understanding of the pros and cons of emergency driving and for ambulance personnel increases their exposure to ill babies which constitutes a relatively small part of their front line workload. It is an opportunity to train paramedics and emergency medical technicians in neonatal resuscitation, increase their knowledge of neonatal disease processes and pathophysiology and augment their repertoire of technical procedures under close, directly observed clinical supervision. British Columbia has been using neonatal paramedic practitioners to perform neonatal air and road transfers for over 30 years; a role that is just starting to be explored in the UK.

The whole concept of the appropriate use of blue lights and sirens as well as issues around emergency driving with neonates on board has received a lot of attention. Auerbach in 1987 analysed the circumstances surrounding ambulance road traffic accidents in Tennessee [6]. The findings suggested that greatest injury was associated with the lack of use of passenger restraints for staff and patients, reduced visibility and high speed, particularly at intersections. The question must always be asked when evaluating the level of urgency of a transfer as to whether emergency driving is going to be truly advantageous to the patient and if the clinical condition warrants it. The effect of movement forces on the cardiovascular and respiratory physiology of a critically ill baby should be considered and the style of driving required discussed within the transport team.

3.3. Equipment

Historically, liaison between ambulance designers, transport equipment manufacturers and clinicians has been poor. Hence the machinery used in neonatal transport has been fraught with compliance and compatibility issues and on occasion is not fit for its intended purpose. For too long equipment has been used outside of its usual environment with little heed paid to making appropriate and safe adaptations for transport. The spectrum of neonatal transport equipment is limited, dialogue has been poor and hence the drivers for change and improvement have been missing.

In 1998 in the United States of America the Centre for Devices and Radiological Health issued a guidance document on what were felt at the time to be suitable specifications for the design and performance features of a neonatal transport incubator as well as to give advice on what constituted appropriate safety and effectiveness testing. The aim was to provide the basis for understanding the intended uses and capabilities of these devices [7].

In 1961 the European Committee for Standardisation (CEN) was founded by the national standards bodies in the European Economic Community. It contributes to objectives of the European Union and European Economic Area with voluntary technical standards that promote the safety of workers and consumers and the interoperability

of networks. In 2000 technical standards for patient stretcher trolleys were developed and recommendations for transport incubator systems were put forward subsequently. These focussed on weight, fixation and electrical requirements. At present these standards are voluntary but over the last 10 years purchasers of transport equipment have increasingly expressed a desire to procure products that are as close to CEN specifications as possible.

We are now starting to see new developments in the transport equipment arena which are largely aimed at optimising functionality whilst reducing risk. One example is the recent development of infant restraints for use within the transport incubator to provide added safety to the baby who may be subject to rapid acceleration or deceleration forces in an ambulance.

All equipment must be serviced to a high standard. Any faults must be reported to and dealt with as soon as possible by the designated equipment technologist. If necessary, prompt return and repair by the manufacturer may be necessary.

3.4. Staff

Against a backdrop of increasing flexibility and innovation in the healthcare workforce transport services around the world find themselves delivering high quality care in all manner of ways. Whether the team is made up of doctors, nurses, ambulance crew or practitioners (either nurse or paramedic) when it comes to safety and good clinical governance it is knowledge, practical skill, good judgement, effective communication and competency that are the necessary requirements. If these are taught and assessed well then professional boundaries become less important and a more cohesive workforce is born; one that can deliver a much more positive impact to a sick infant. In order for the service to run well the appropriate support must be in place. To that end there should be secretarial and administrative staff, a designated equipment technologist, a team coordinator and paramedic, nursing and medical leads with an overall medical director to oversee safe running of the day to day service as well as to take responsibility for training, dealing with all governance issues and whose role it is to develop the service further.

3.5. Training

This is a fundamental part of maximising safety and minimising risk. All transport staff must be trained in the specific skill sets and knowledge base relevant to this subspecialty. It is dangerous to assume that an individual's capabilities in unit based practice can be automatically transferred to the transport environment.

Aspects of relevant training include communication such that the staff are able to efficiently extract important clinical and operational information pertinent to a particular situation from another person either over the telephone or face to face. The patient handover must be conducted well. If not, pieces of information vital to the baby's welfare are easily missed and all subsequent actions compromised. At handover all key individuals must be present and identified. Conversations must be had one at a time with additional information or changes mentioned at an appropriate interval. The transport clinician needs to be able to convey this information succinctly to a senior colleague who may not be present with them. The ability to calmly describe the level of urgency of a situation and to be able to ask for help when needed is vital. Being able to communicate effectively and tactfully within the transport team as well as being able to talk to local hospital staff and parents in a way that empowers and supports them is essential to maintaining morale and ensuring the greatest productivity in a stressful situation.

Problem solving and gaining control of transport requirements is a vital skill covering areas such as identifying the appropriate staff to perform the transfer. Identifying the correct equipment needed and the requisite supplies including gas and power requirements is a must

if one is to avoid disaster. Gaining total equipment familiarity both as part of the induction process and by having periodic spot checks is helpful. Making sure all staff are competent with all pieces of equipment minimises risk in the face of unexpected staff illness and retains fluidity in the performance of the team without associating particular pieces of equipment as being the domain of any particular team member, medical, nursing or paramedic.

The skill of triage is important. Requests for transfer are not necessarily accepted in time order and a clinician must develop the ability to constantly evaluate the level of urgency of requests particularly when the clinical condition of the patient may be changing. In this way the distinction from the unplanned, time critical unstable baby right down to the non urgent planned retrieval can be made safely with the minimum incidence of adverse event due to clinical misjudgement. Broughton et al looked at the use of mortality risk predictor scores calculated at the point of receiving the telephone referral as a possible triage tool [8]. The Advanced Life Support Group accredited Panstar course was developed to provide paediatric and neonatal retrieval staff with the skills to process referrals appropriately, gain control of the transport environment and streamline procedures with a view to minimising risk and maximising safety [9].

3.6. Clinical competencies

The ability to be able to ascertain a relevant neonatal medical history, elucidate the salient positive and negative facts and thoroughly examine the patient are absolute basic requirements. It is critical for the transport clinician to be able to make a swift and accurate assessment of the clinical status of the baby and to communicate this to the other team members. Effective communication also involves senior colleagues and local and receiving unit staff allowing them to prepare properly for the infant's move. It is not enough merely to maintain the status quo. The transport clinician should expect patient deterioration en route and aim to optimise in advance of that. On top of this logistical challenges must be identified and overcome and appropriate delegation effected such that tasks are performed in parallel and simultaneously rather than in sequence. These latter skills are clearly ones that develop with experience and feedback.

With regard to practical competencies there are certain requisite skills for this type of work:

3.6.1. Airway management

Most critically ill neonates requiring transfer to a neonatal intensive care unit will need respiratory support of some description so the ability to safely manage a neonatal airway and to provide mechanical ventilation appropriate to the underlying medical condition is necessary.

3.6.2. Intravenous access

Transport clinicians must be able to secure both peripheral and central venous and arterial access for safe drug and fluid administration as well as to provide invasive monitoring in a reliable fashion.

3.6.3. Advanced procedures

Competence in performing less common but nevertheless life saving procedures is also required. These procedures may involve needle aspiration of the chest, chest drain insertion, intra-osseous needle insertion or abdominal paracentesis.

3.6.4. Resuscitation

Obviously for a clinician operating in this setting this skill is essential. Ideally, proof of having attended and passed the accredited training course would be desirable. Regular refresher sessions help to maintain a skill that should be second nature.

Every transport service should have a set of clinical and operational guidelines to help those working within the team. As style and practice may vary from hospital to hospital even within a perinatal

network it helps if these guidelines are produced and agreed in principle across the region served by the service.

3.7. Indemnity

Emergency patient transport particularly when associated with the use of blue lights and sirens is considered high risk. It is strongly recommended that all staff investigate the extent of their current insurance cover as provided by their hosting trust or ambulance service. It may be that further personal accident indemnity is advisable.

3.8. Audit

One of the foundations of good clinical governance is rigorous audit. Neonatal transport is a relatively green field of new and changing processes that need to be measured and compared to gold standards that in themselves may have been quite recently set. In the UK there has been a conscious move for neonatal transport services to collect similar data, share best practice and benchmark. A national neonatal transport special interest group was set up in 2006 with a view to facilitating the above. In this way, although patterns of service may vary hugely, this sort of data collection will pave the way for national audit and setting of improving standards of care in the area of retrieval medicine.

3.9. Feedback

Performance improvement can only come through good feedback which is tactful and constructive. Through this process reflection is more likely to lead to a positive change in an individual and improved sequential performances. Case debriefs on each transfer are important to look at both operational and clinical aspects with a view to reinforcing good practice and identifying areas for improvement. It is also a good opportunity to review dispatch and stabilisation time-frames and to make sure that time has been used efficiently.

Incident reporting must be encouraged and a “no-blame” culture fostered. Having a robust risk reporting mechanism is important. On a formal basis if the service is not hospital based it should have a predetermined way of managing critical incidents and a service manager who receives reports and feeds them into a clinical governance group where circumstances can be examined. In terms of sheer numbers these are likely to be far less than those received by an entire NHS trust or even hospital directorate risk management committee. Because of this it is possible to perform a full root cause analysis on all critical incidents reported within a single transport service. The added challenge though is that the different professionals involved in a particular case are likely to be employed by different organisations (eg referring and receiving units, the transport team and possibly even the network centre). As a result, fact finding, debrief and feedback are more complicated to carry out but possible nevertheless. It is also good practice to feed incidents into the governing or hosting NHS trust's reporting structure as well if the transport service is hospital based.

Incident reporting into a national body such as the National Patient Safety Agency (NPSA) has so far been extremely patchy. The National Reporting and Learning System (NRLS) is a confidential reporting system. It supports the role of the NPSA to make patient care safer.

Incidents have been reported by NHS organisations across England and Wales and are submitted through a variety of routes such as from individual NHS staff, through local trust risk management systems and web based e-forms. Between 1st January and 31st December 2006 transfer of care issues constituted 8% of neonatal incidents reported via the NRLS [10]. The Royal College of Paediatrics and Child Health last year commissioned a national project to be carried out by working groups to look into three specific areas of neonatal care associated with incidents reported into the NRLS. A transport working group was set up with a view to developing a set of evidence based care bundles for implementation into the neonatal transport setting that would have a positive impact on practice.

3.10. Key guidelines

- Neonatal transport teams have greatest familiarity with transport associated risk.
- Ambulance services should be integrated into infrastructure.
- Equipment and vehicle design should aim for CEN compliance.
- Specific transport training should be based on competencies.
- National benchmarking will improve safety.
- Robust incident reporting mechanisms must be in place.

4. Conclusion

Transporting critically unwell babies via ambulance is a process associated with a very high level of risk. This patient group tends to be unstable and the ambulance environment is a hazardous one. Service delivery is very variable across the country with major infrastructural differences. Equipment issues need urgent attention. Staffing patterns, roles and responsibilities are changing and training needs are many. Recognition of the major elements of risk in this field needs enhancing. Reliable and consistent methods of reporting adverse events and acting on the findings are areas in need of development. It is a time of rapid service evolution and the perfect time to focus on clinical governance and safety aspects.

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