Newborn Transport

Deniz YİĞİT

Abstract
Newborns with critical health status need to be moved to another center if there is no appropriate healthcare centers or if the level of care is insufficient for the newborn’s condition. During the transport of the newborn, it is important to provide stabilization and give qualified care to newborn. It is very important for health personnel to have adequate knowledge and experience on this topic, to participate in regular trainings on transport and to follow current developments for effective and correct transport service. This article aims to highlight necessary things to be done by health personnel for effective and correct application of neonatal transport.

1. Introduction
Newborn transport is a high-risk service system throughout the world that ensures that babies are transferred from where they were born when there are no appropriate care centers for the newborn or when the level of care is inadequate for the newborn’s condition (Caverni, Rastrelli, Aufieri, & Agostino, 2004; Cornette, 2004; Yildiz, 2008). This service system is influenced by many factors such as the birth rate of the country where the transport is made, the number of NICU (neonatal intensive care unit) and level of care, geographical situation, and financial resources (Cornette, 2004). It is very important to stabilize the newborn and give qualified care during transport (McEvoy et al., 2017).

2. History of Newborn Transport
Before people invented the wheel, they carried their patients on their laps and backs to the hospitals and started to produce different tools for transport after invention of the wheel (Kenner & Lott, 2003). In the US in the 1920s, 63% of babies lost their lives in the newborn period. Therefore, protection of newborns from infections and maintenance of their body temperature became important. An incubator station was set up to protect body heat during the transport of newborns and the first ambulance incubator was developed. With this newborn ambulance, 94 newborn transports were realized in the first 3 years (Oppenheimer, 1996; Tekinalp, 2003). In 1933, an ambulance was designed for use in newborn transport in the USA. In 1948, an organized ambulance service was set up and the

1 Corresponding Author. Research Assistant, Eskisehir Osmangazi University, Faculty of Health Sciences, Department of Pediatric Nursing, MSc, RN, deniz.yigit@dpu.edu.tr
newborns started to be transferred by hand-held incubator, which was made of aluminum, with oxygen tanks which were being heated with hot water bottles. With this ambulance and incubator transfers of babies even under 1000 gr were successfully performed. Australia and the United States are the leading countries in the initiation and systematic use of modern newborn transport system. The studies on the neonatal emergency transport system (NETS) in most developed countries were started in the 1970s (Kenner & Lott, 2003).

Although a certain part of the proposals submitted for studies on newborn transport is valid for all countries the vast majority of the proposals are highly regional. Today, newborn transport in developed countries is done by trained and experienced health personnel (Gulez et al., 2004). In developing countries, factors such as nonhomogeneous distribution of health services, geographical structure, population density, social security, and economic situation affect the utilization of health services (Perk, 2003; Yalaz & Kultursay, 2004).

3. Transport Types

- **Inutero Transport**: The cheapest and the safest transport type. It is important for mothers in the high-risk group to be sent to centers necessary centers during pregnancy (Barry & Leslie, 2003; Yildiz, 2008).

- **In-Hospital Transport**: There may be a need for more specialized consultation, systems that provide advanced life opportunities, and intensive care within the institution where the newborn is located. Transport rules are applied even if the transport distance is short (Cornette, 2004; Yildiz, 2008).

- **Inter-hospital Transport**: The transport of high-risk newborns to centers specialized in the care of patients at risk (Cornette, 2004).

4. Selection of Vehicle and Required Hardware for Transport

Primarily the transport vehicle should be selected. In the selection of the vehicle factors such as the weight of the patient, urgency of the situation, transport time between hospitals, staff availability, air and traffic conditions, safety and cost should be considered (Powers Karen, 2002; Yildiz, 2008; Bellini et al., 2017). Hardware in the interior of the vehicle is as important as the selection of the vehicle. The tools required for transport must be used only for this purpose (Major, 2002). Drugs and tools must be prepared by the transport team, must be in working condition, be stored in sufficient quantities, and ready for emergency transport. The precautions to be observed in the interior equipment are as follows (Yildiz, 2008);

- All in-vehicle equipment must be fixed,
- The battery of the devices must be sufficiently full and must have additional power supplies,
- Environmental conditions must be provided to reduce the risk of excessive noise, vibration and infection,
• Tools must be easy to carry and clean, and not affected by electromagnetic fields,
• A fast and secure transport should be achieved.

5. Transport Team and Their Roles
The members of the transport team vary according to the health systems of the countries. In general, members of the transport team include nurses, neonatal intensive care nurses, respiratory therapists, doctors/neonatologists, emergency medical technicians, ambulance drivers or pilots, and other personnel who received special education on this topic (Lupton & Pendray, 2004).

Physician: Neonatologists are at the highest level of their specialty (Davis, Manktelow, Bohin, & Field, 2001). They are not usually present during the transport. In some systems, assistant doctors can be found in the transportation of newborns whose situation is critical (Yildiz, 2008).

Nurse: A specially educated nurse is the basic element of the transport team (Lee et al., 2002). They may be very effective by consulting a physician when necessary. Studies have found that transports performed by the leadership of a nurse were more advantageous in many aspects (Leslie & Stephenson, 2003; Morrison & Cheema, 2007; Hampton, 2014) and its cost/effectiveness was lower. For this reason, the number of transports under the leadership of a nurse is increasing in many countries today (Bozkurt & Duzkaya, 2014).

Respiratory Therapist: Takes an active role in ensuring respiratory stabilization during transport and ventilator management (Lee et al., 2002).

Pilot/Drivers: Must have received appropriate training and certifications regarding transport services. Ambulance drivers should comply with speed limits and traffic signs (Barry & Leslie, 2003; Lupton & Pendray, 2004; Yildiz, 2008).

The American Association for Neonatal Nursing (NANN) has defined compulsory training for staff that will transport newborns. These trainings should be given to the health personnel at regular intervals. These educations are as follows (Kenner & Lott, 2003; Yildiz, 2008):
• Newborn reanimation program and pediatric advanced life support
• Maternal factors affecting newborn
• Physical evaluation of newborn
• Interpretation of laboratory and other results
• Thermoregulation
• Advanced airway applications
• Medication and fluid therapies
• Diagnosing disturbances and diseases associated with newborns
• Strategies to increase team performance
• Planning a transport
• Establishing security

6. Transport Procedure

When transport decision is made the family should be prepared for transport. The transport is communicated with the family and consent is obtained. Detailed information about the unit to be gone is given to the family. Information to be given to the family include location of the unit, address, telephone numbers, parking facilities, places to stay in close proximity, hospital rules, rules regarding visitor hours, and names of persons who may be responsible for the care of the patient. According to the team policy, a parent is allowed to go with the baby. The footprint of the baby is taken, a band showing the name of the infant is placed, and all the documents belonging to the baby and the mother are taken (Yildiz, 2008).

A responsible physician with sufficient information makes the transport call. The appropriate team, vehicles and materials are selected according to the newborn’s situation. Team members evaluate the situation of the patient and share transport duties (Campbell & Dadiz, 2016; McEvoy et al., 2017). The newborn is attached to the incubator with a rigid, inflexible belt or rolled up blanket during transport, and the body temperature, pulse rate, respiratory rate, blood pressure and oxygenation status are monitored by continuous monitoring. Respiratory support is provided if required (Yildiz, 2008). When transport is carried out, all information related to transport is transmitted to the family and healthcare personnel of the receiving hospital. At this stage it is important that the healthcare personnel establish a healthy communication with the other staff and the family (Hadley & Mars, 2001).

7. Legal and Ethical Issues for Transport

Ethical issues related to neonatal transport are generally related to management, medical issues and transport staff. The dilemmas of medical treatment and care for neonates with problems expected to worsen clinically such as genetic impairment, advanced asphyxia, low birth weight or a fatal anomaly cause ethical problems (Karakoc Tari, 2008). During transport, the authority and responsibilities of the personnel must be determined, and these responsibilities should not be open to legal interpretation (Ergenekon, 2003; Robles et al., 2017). Each country should have national and local regulations on transport, and professional standards (Tekinalp, 2003; Yildiz, 2008).

8. Conclusion

In conclusion, it is important that the technical conditions in newborn transport should be provided and the transport is performed by health personnel who has expertise in this subject. Health personnel need to follow scientific developments, participate in trainings at certain intervals, and establish new transport systems in the light of scientific developments.
References


