

Organ Donation in Young Infants

Lechner¹ has written recently about the difficulties in facilitating a parents' request that the organs of their terminally ill newborn infant could be harvested for organ donation. The infant was receiving intensive care and therapeutic hypothermia for irreversible neonatal encephalopathy. The author found that there was a paucity of knowledge and experience in relation to neonatal organ donation.

In the United States between 1988 and 2013 there has been only 100 organ donors annually aged less than 1 year. In New England the average of donations is as low as just one or two annually. Over the preceding 28 years only 2 neonatal organ donations have taken place in the State. In Rhode Island there have been no organ donations from infants less than one year.

Marshall et al² have reported that in the 11 year period 2007-18 in Ireland there were organ donations or tissue heart valves from 36 deceased children. The age range was from day 1 of life to 15 years. This represents a donation rate of 2.9 per million population of children, compared with the US donation rate of 1.2 per million children. The Irish data found that the survival of donor grafts was 80% for kidneys, liver, lung, and heart.

The most recent UK data reports that there was 57 deceased paediatric organ donors aged 0-17 years. The total number of deceased donors across all age groups was 1574.

Lechner points out that paediatricians' ability to understand and apply the criteria of brain death in young infants leaves substantial room for improvement. Therefore it is not surprising that cases of neonatal organ donation are rare. There is both a lack of unawareness and a reluctance to raise the subject of organ donation with the parents of a terminally ill infant. More often than not the request comes from the parents rather than from the caregivers. There is an increasing awareness in society about the need for organ donation and transplantation. In children, the scarcity of available organs is a major limiting factor in the paediatric transplantation programme.

Experienced, senior staff are required. There must be a strong emphasis on the training of caregivers who approach families about organ donation. It is a complex process. It includes the following steps:

1. The identification of a potential donor
2. The referral to a specialist team
3. Obtaining informed consent
4. The determination of death
5. Donor management
6. The recovery of organs

The major stumbling block has been the challenges around the diagnosis of brain death in young infants. The determination of death: There are two ways of determining death. The more longstanding modality is the declaration of death by neurological criteria (DNC).

In 1991 the British Paediatric Association (BPA) later to become the Royal College of Paediatrics and Child Health (RCPCH) stated that over the age of 2 months the criteria used to establish brain death should be the as that in adults. At the time it felt that it was not possible to confidently diagnose brain death in infants between 37 weeks gestation and 2 months.

In the intervening years 1990 to 2014 there was an expansion in the literature relating to the diagnosis of death in young infants. The RCPCH revisited the issue and produced the Document 'the diagnosis of death by neurological criteria in infants less than two months old' April 2015. After reviewing the evidence, the working group stated that there is now sufficient evidence to extend the criteria for brain death diagnosis to this patient group³. The guidance is not applicable to preterm infants less than 37 weeks gestation. The preconditions are that the infant is comatose, mechanically ventilated, and the diagnosis established. The clinical diagnosis of brain death is then established with the absence of brain stem reflexes, absent motor responses, and no respiratory response to hypercarbia (rise in arterial PCO₂ >2.7 kPa above a baseline of at least 5.3 kPa). The diagnosis of brain death is to be made by 2 paediatricians who have been registered for more than 5 years. At least one should be a consultant. The testing should be undertaken by the paediatricians together and be performed on 2 occasions. The prime purpose of the second examination is to minimize the possibility of an incorrect diagnosis because of error in the first examination. The interval between the 2 examinations is not specified but it need not be prolonged. In previous studies it has ranged from 30 minutes to 4 days or more.

The second modality is the declaration of death by cardiac criteria (DCC). DCC has been used more frequently in recent years.

There are fundamental differences between DNC and DCC.

In the case of DNC, the state of irreversible loss of brain function is confirmed. Organ removal can take place in a controlled, timely sequence.

In the case of DCC, the process is based on removal of the organs after the circulation has ceased. It offers the potential to increase the number of paediatric donors into the future. It is best suited to cases where the child is expected to die shortly after the withdrawal of care. Life support is withdrawn, the heart stops, and then the organs are removed. One of the most debated issues is at what point death can be declared after the cessation of the circulation. The longer the period of time, the greater is the risk that donor organs will become ischaemic and unsuitable. There appears to be a growing consensus

to apply a minimum of 5 minutes of continuously observed and monitored absence of the circulation.

Heart beating organ retrieval from babies born with anencephaly was abandoned in the 1980s because of concerns over the validity of brain death criteria in this group⁴. However a small number of anencephaly infants have been successfully included as donors using death by cardiac criteria.

Lechner's paper raises awareness about organ donation in young infants. The number of potential donors is small but there is room for improvement. The better understanding and acceptance of brain death criteria in young infants is a step forwards. In addition the alternative of death by cardiac criteria offers an alternative in selected cases.

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Editor

References

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