

## The Potential for Organ Donation in a University Hospital in Israel

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**Key words:** organ donation, potential brain death, missed brain death

### Abstract:

**Background:** One of the major reasons for the shortage of organs for transplantation in Israel is the failure to identify potential donors. According to the World Health Organization, the expected number of potential donors in Israel is 300 per year. In recent years an average of only 200 donors (2/3) has been identified.

**Objective:** To identify the reasons for the gap between the potential and the actual number of organ donors.

**Methods:** We reviewed the medical records of all potential donors at the Soroka University Medical Center between October 1997 through September 1999.

**Results:** The total of 183 death records was consistent with the minimal inclusion criteria for potential organ donation, of which 41 were suspected to be potential brain death. In 31 cases an *ad hoc* committee had declared brain death, and the patients were evaluated for organ donation. However, in 10 cases no committee was formed. We found that 24.4% (10/41) of the potential donors had not been designated as such by their medical team.

**Conclusion:** We believe that a comprehensive education program for medical and nursing staff might increase awareness for organ donation and may eliminate the gap between the potential and actual number of organ donors.

*IMAJ 2003;5:615-617*

For Editorial see page 666

While the demand for solid organ transplants in Israel and around the world continues to increase, the number of actual organ donors has hardly changed [1-9]. Progress in transplantation medicine has been impressive in the last four decades, with new techniques and immunosuppressive agents making transplantation the treatment of choice for a significant number of patients with end-stage organ failure [2,6,7,10].

However, over the last few years it has become increasingly evident that the primary impediment to progress in organ transplantation is no longer a lack of technology, but a lack of donor organs [5,7,8,10]. Many methods to increase organ and tissue donation have been proposed, including a required request

legislation, presumed consent, relaxation of donor criteria, xeno-transplantation, unencephalic donation, public and professional education, and payment of a death benefit to donor families. Their effectiveness has, however, been questioned [8].

At present, about 1,010 patients are awaiting solid organ transplantation in Israel. According to several investigators, the potential organ donor pool should include approximately 50 donors per million population per year [1,3,4,6]. Therefore, the number of potential donors in Israel is estimated at 300 per year. In recent years, however, an average of only 200 donors (66%) has been identified.

In this study, we reviewed the medical records of all potential donors at the Soroka University Medical Center in Beer Sheva, Israel, from October 1997 through September 1999, and assessed the reasons for the gap between the potential and the actual number of organ donors.

### Materials and Methods

The Soroka University Hospital, with over 1,000 hospital beds and 40 beds in the Intensive Care Unit, is the only tertiary care facility in southern Israel and serves a population of over 750,000. The potential for brain death in this hospital during this period was estimated, using a step-by-step evaluation of the deaths in the hospital, as reported previously [3,4].

### Step I: Medical records review

The medical records department provided a computerized list of all persons who had died in our hospital between 1 October 1997 and 30 September 1999. Excluded were patients over the age of 65, or those who had been diagnosed with one or more categories of ICD-9-CM. The contraindications for organ donation included: malignancy not confined to the central nervous system (ICD9: 140-239, except 191), AIDS/human immunodeficiency virus+ (ICD9: 042.0-044.9, V08), sepsis (ICD9: 038), active tuberculosis (ICD9: 010.0-018.9), syphilis (ICD9: 090.0-099.0), and collagen disease (ICD9: 710.9) [3,4]. The remaining records in which the ICD-9-CM code was consistent with a possible diagnosis of brain death were selected for further study.

## Step II: Neurologic assessment

The study records were examined to confirm the absence of medical contraindications, and to determine whether the patients met the clinical criteria for brain death, as defined by the 1996 Circular Letter of the Israel Ministry of Health.

## Step III: Expert review

All the records that appeared to meet the criteria of brain death were reexamined by an expert transplant surgeon for signs or symptoms of brain death, and for the lack of contraindications for organ donation. Since medical records may fail to provide a uniform and objective source of information about potential brain death, this expert review was both intensive and lengthy.

## Definitions of variables

- *Missed brain death*: a condition consistent with brain death, with no contraindications for organ donation, but with no declaration of brain death.
- *Actual brain death*: a condition consistent with diagnosed brain death according to the proper procedure.
- *Potential brain death*: a condition that includes all missed and actual brain death patients.

## Results

During the period under review, 2,709 people died in the Soroka University Hospital, of whom 2,526 were excluded as described in Step I. Of the remaining 183 deaths, 128 did not meet the criteria for brain death, as outlined in Step II. The records of the remaining 55 patients were studied in detail by an expert transplant surgeon, as described in step III, and another 14 patients were eliminated. The 41 remaining potential brain deaths that were detected between 1 October 1997 and 30 September 1999 represent 1.5% of all deaths at the hospital during that period.

Our chart review revealed that 31 of 41 (75.6%) had been declared brain deaths in the medical records (actual BD), while 10 cases (24.4%) had not, despite clinical findings consistent with brain death (missed BD).

Table 1 presents the demographic characteristics and causes of death in the three brain death groups. Head injury was found to be the main cause of death in almost one-half of the actual brain death patients. In contrast, non-traumatic brain hemorrhage was the principal cause in 50% of the missed brain death group.

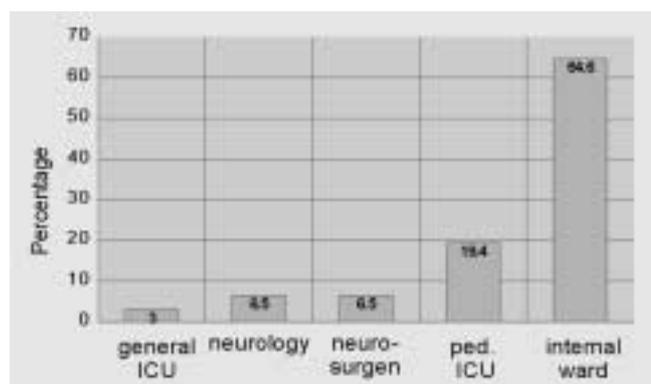
The average age of the patients in the missed brain death group was 47.5 years (the average age in that group without the two cases in the pediatric ICU was 58.5 years). In contrast, the average age of the patients in the actual brain death group was 32.5 years (the average age in that group without the two cases in the pediatric ICU was 34.6 years).

Most of the missed brain death cases (50%) occurred in the Department of Neurology, whereas more than 64% of the actual brain death cases occurred in the General ICU, as illustrated in Figures 1 and 2.

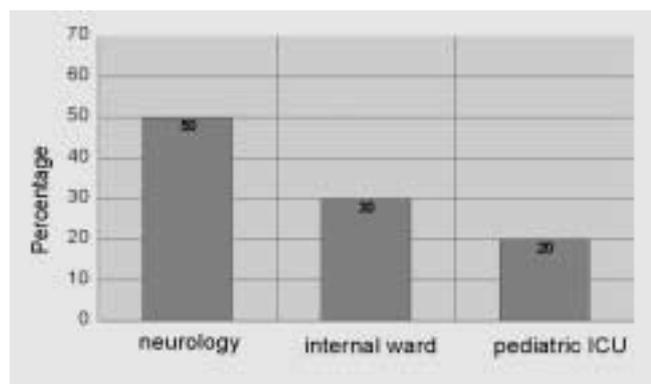
BD = brain death  
ICU = Intensive Care Unit

**Table 1.** Demographic characteristics and causes of death from the potential brain death group, actual brain death group and missed brain death group

	Potential brain death (n=41)	Actual brain death (n=31)	Missed brain death (n=10)
Gender			
Male	63.5%	64.5%	60%
Female	36.5%	35.5%	40%
Average age (yrs)	36.2	32.5	47.5
Cause of death			
Head trauma	35.9%	48.3%	–
Stroke	18%	13.8%	30%
Brain hemorrhage	25.6%	17.2%	50%
Anoxic brain damage	7.7%	6.9%	–
Other	12.8%	13.8%	20%



**Figure 1.** Distribution of actual brain deaths according to the department caring for the patient at the time of death



**Figure 2.** Distribution of missed brain deaths according to the department caring for the patient at the time of death

## Discussion

Brain death detection is the first step in the donation-transplantation procedure. This study assessed the incidence of brain death in a tertiary hospital in Israel to estimate whether the medical staff successfully detected all cases of brain death. Our 2 year study identified 41 potential brain deaths in a hospital serving a

population of 750,000 (27.3 potential brain deaths per million population per year).

We found that the medical staff did not identify 24.3% of potential brain deaths. The failure to detect brain death was especially remarkable in the neurology department (50%): the patients involved generally were older and suffered an acute stroke, which, according to the National Transplant Center in Israel, is responsible for 51% of all brain deaths in the country [12].

Previous studies have indicated three main stages in the donation process where potential donors are lost: a) non-identification of patients as potential donors, b) failure to ask the family to donate, and c) families' refusal of consent to donation [4,9].

Our study shows a significant loss of potential donors (24%) as a result of non-identification. Nathan and co-workers [11] also found a significant loss of potential donors (34%–47%) as a result of non-identification, while Garrison and colleagues [3] found that 16% of potential donors were not identified.

The reluctance of healthcare providers to refer potential donors may stem from grief, lack of familiarity with transplant procedures, difficulty in perceiving the patient as a donor, or time limitations. Recent studies have confirmed that education and donation protocols may alter professional attitudes toward organ and tissue donation [8].

A brief period of intense effort to stimulate donor identification through professional education may result in an eightfold increase in the number of cadaver kidneys retrieved in a 3 year period. We suggest that an educational program that includes frequent workshops on brain death detection, focusing on the eligibility of older patients and those who have suffered a non-traumatic event, may increase the number of organ donations in Israel. Criteria for donor identification, and the optimal consent process, should be included in the program.

The targeted personnel for the education program includes: a) medical staff, particularly trauma surgeons, neurologists, and neurosurgeons; b) nursing staff, particularly emergency room and

intensive care nurses; c) related staff such as social workers and clergy; and d) administrators involved in policy making.

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