Bioethics in Solid Organ Transplantation

Alternative methodologies being utilized in the prevention of solid organ shortage

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INTRODUCTION

Currently in the United States, 95,062 individuals wait for their chance of receiving a lifesaving organ for transplantation.[11] Though there were 26,689 transplants performed in 2006, there is still not a sufficient supply of donors and organs to meet the demand of those individuals needing transplantation. Unfortunately six percent of possible recipients die while on the waiting list.[11]

These staggering figures have opened the bioethical debate of how the United States can compensate for the shortage of solid organs for transplantation. With this in mind, the transplant community is utilizing new methodologies in order to increase the number of organ donors and the amount of solid organs used in transplantation.

These methodologies of utilizing marginal donors, living donation, alternative organ allocation systems, xenotransplantation and stem cell research are currently approached in bioethical debate from the local to the national levels. This article will give insight into these methodologies and how they can assist in the increased amount of solid organs for use in transplantation.

ORGAN RECOVERY FROM MARGINAL DONORS

In today's organ donation system, organs are recovered from deceased donors (DD) and living donors (LD). In the past, most surgeons would use only those organs that came from healthy, young donors. With the number of waiting candidates surpassing the number of donors 7:1, there has been a need to seek organs from donors who are considered marginal.

Marginal donors include those individuals over 55 years of age (extended criteria donors), pediatric donors under 5 years of age, non-heart beating donors (or donation after cardiac death, DCD), and donors who have certain disease processes and serologies (ie diabetes and HIV).[1]

> Should an individual with an emergent need but a shorter life expectancy receive an organ before someone with a longer life expectancy?

NON-HEART BEATING DONORS

There has been increasing debate in the field of non-heart beating donation. Until recently, few communities would allow recovery of organs from non-heart beating donors. In this type of donation, the patient does not meet all of the criteria to be pronounced "brain dead." Although, if the patient is removed from life-sustaining medications or ventilation, the patient will ultimately pass on.

DONATION AFTER CARDIAC DEATH

Donation after cardiac death allows the family to donate their loved one's organs immediately after the patient's heart stops beating. The controversy behind this donation is that when the patient enters the operating room, he or she is technically still alive. These patients are removed from their medication and from their ventilator in a controlled method by the intensive care unit staff, as the recovery team waits outside for pronouncement of death.

An ethical question surrounding DCD is this: Are physicians being presumptuous in stating that there is no hope for these patients, in order to fight against the problem of organ shortage? Or does this open up another avenue to obtain organs from those individuals for whom, if medications and ventilation are removed, there is no hope of survival?

HIV-POSITIVE DONORS

Another controversial issue concerns donors who are HIV-positive. With the creation of life-sustaining drugs (ie AZT), HIV patients are able to survive longer than first expected. With their life expectancy increasing, do HIV-positive patients have the right to obtain solid organs for transplantation if they are in need?

In order to facilitate this, organs are being recovered from HIV-positive donors and are being transplanted into HIV-positive recipients. This allows the recipient to receive an organ, which they might not otherwise have the opportunity to receive. Does their placement on the Organ Procurement and Transplantation Network (OPTN) list jeopardize HIV-negative candidates' chances of receiving an organ?

ORGAN RECOVERY FROM LIVING DONORS (RELATED, UNRELATED AND ALTRUISTIC)

In the shadows of deceased donation, there has been an increase in living donation. Living donation is the process in which a live person is willing to give an organ or a part of an organ to another individual. Though these procedures were created for individuals who were related to one another, there has been a growth of unrelated living donation and donation by altruistic strangers.

In 2006, there were 6,194 living donors, compared to 7,383 deceased donors.[11] In these cases, an individual who is not related genetically—or is a complete stranger—to the possible recipient, is willing to donate an organ or a part of an organ to someone in need.

With the invention of the Internet, it has become easier for altruistic strangers to find a

"worthy" candidate for their organs. Websites such as *www.MatchingDonors.com* and personal websites like *www.babymarkjr.com* allow prospective living donors to read stories from thousands of individuals that are in need of lifesaving organs. Currently the solid organs that can be given by a living donor include kidney, split liver, lung, split pancreas, and small bowel depending on the situation.

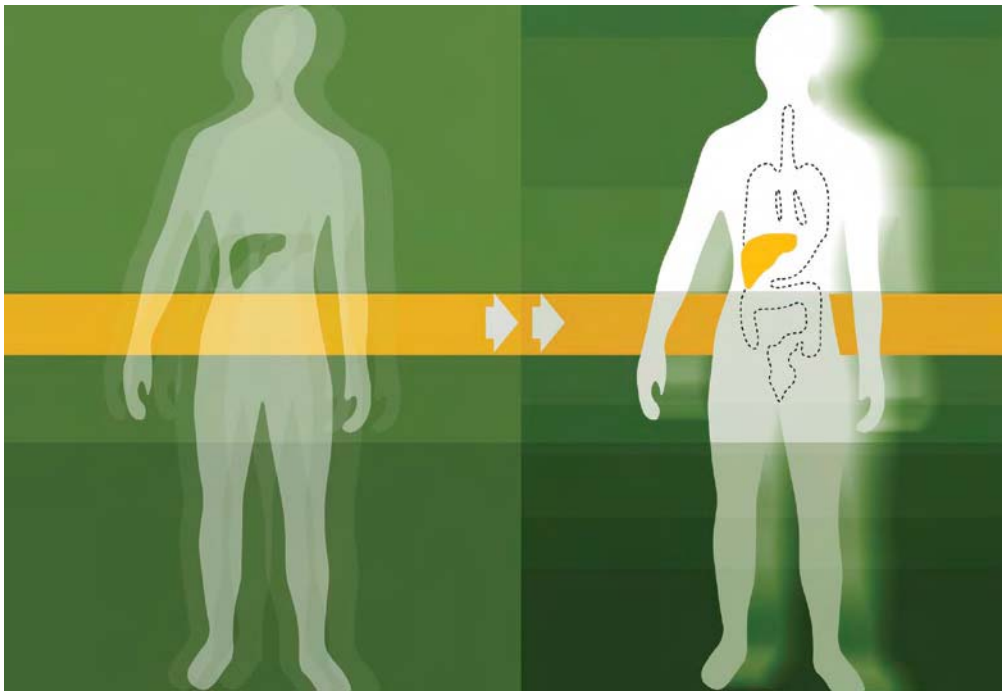
The ethical concerns surrounding the use of living donation has sparked the interest of discussion within the US Department of Health and Human Services (HHS), the United Network of Organ Sharing (UNOS), and has most recently been the subject of the President's Council on Bioethics.

The key issue of current discussions has been the question of whether or not performing surgery on a living donor violates the Hippocratic Oath—"To do no harm and to act always in the best interests of every patient in his care."[5]

Among the bioethical questions regarding living donation, focus has been placed on donor safety. Currently, neither UNOS nor the HHS has policies regarding a standardized informed consent for living donation.[9] This informed consent needs to be created in order to inform possible donors properly of surgical risk, their right to change their minds, and that there may be a possibility of future health problems resulting from the donation, and that those problems may not be covered by insurance.[9] In order for living donation to continue being an avenue for preventing organ shortage, the benefits to both donor and recipient must outweigh the surgical and psychological risks.

In addition, there is the question of whether living donors should be rewarded for their gift. This reward would come in the form of treatment of future complications resulting from the donor procedure. It would also include allowing the living donor extra points on the OPTN waiting list, in case they are ever in need of an organ. There are also those who feel that living donors should be given financial compensation, but it is still being debated.

One effort that has assisted in the living donation of paired exchange (where two or more sets of living donors and candidates are matched with each other to provide compatible donors to each recipient) has been the recent introduction of US House of Representatives Bill 710 and US Senate Bill 487. These proposed bills would create federal legislation that would allow more individuals to become donors, thus creating more opportunities for transplant candidates to receive needed organs.[13]



INCREASING ORGAN RECOVERY FROM DECEASED DONORS

Despite efforts to increase the use of extended criteria donors, donation after cardiac death, and living donations, the best source of donors for solid organ transplantation remains deceased donors. Unfortunately the number of deceased donors has

increased only 45% since 1988, while the number of living donors has increased 71%.[11] How can we increase the number of deceased donors, and therefore reduce the organ shortage?

PROPOSAL 1: GREATER EDUCATION

According to Cantarovich, society must increase the role of education—both for medical providers and the general public.[4] He feels that society must be informed that organ transplantation is a common and successful practice and that the act of donation "offers a unique source of health and provides a chance of life and well-being for everybody."[4]

"Should family members receive financial compensation for donation, since our society views organ donation as an altruistic and unselfish giving of one's self?"

Some of his ideas on education include a youth commitment to organ donation as an obligation to society, the assurance of integrity and respect for the cadaver during and after organ recovery, and an overall improvement in the general public's unawareness and belief in myths and superstitions regarding organ donation.[3] He concludes that education of society could change behaviors toward the use of organs after death, eventually leading to a reduction of the organ shortage.[4]

PROPOSAL 2: AUCTION MARKET

Dr Jack Kevorkian, the man made famous over the concept of physician-assisted suicide, proposed a second concept of increasing the number of deceased donors. He suggested the implementation of a free, nonprofit and potentially global online auction market.[10]

His system resembles a modern-day "organ stock market." When a donor is pronounced "brain dead," the organs are listed on the auction site. Individuals who want to purchase the organs make their bid through an "organ broker" at a regional transplant center.

Upon confirmation of a bid, the recipient must make payment within 48 hours, or the organs will be given to the next highest bidder. According to Kevorkian's formula, 33% of the funds would go to the donor's family, 11% would go to each of the recipient transplant centers (for future bidding and for those patients who are poor or uninsured). Finally a 1%-fee would be applied to cover the administrative costs of running and operating the auction. The idea behind this proposal is that it would give families an incentive to donate their loved one's organs, and it would provide financial stability to the family.

The negative side of this proposal is that some patients may not be able to compete in the bidding process as well as wealthier patients could, regardless of which patient is in greater need of the organ.

In addition, how would the money for the donor's family be distributed? Will it be deposited as part of the donor's estate, or will it be given to the family member who decides to donate the deceased person's organs?

Similar programs that have been created have included tax breaks, paying for funeral expenses and even paying the family a flat rate for donation. The question for debate is, "Should family members receive financial compensation for donation, since our society views organ donation as an altruistic and unselfish giving of one's self?"

In Kevorkian's article, "a procured human organ is the most valuable and essential item in any transplantation procedure."[10] It is a fact that without the presence of the human organ the recipient would not be able to receive a transplant, the physicians would not have patients, and the organ procurement organizations (OPO) would not receive any funding.

What is wrong with putting a financial number on the recovered human organ? OPOs currently place fees on every organ that is recovered. For instance, many OPOs charge insurance companies and Medicare upwards of $25,000 per kidney recovered. That equals $50,000 received for

just the donor's kidneys, and that doesn't include other organs that may be recovered, such as heart, lungs, liver, pancreas and small bowel. Regardless, there are still physicians and organizations that feel that payment for organs is "unethical."

PROPOSAL 3: INCREASED AWARENESS

The third proposed way of increasing deceased donation relies on the use of mass media and the Internet to focus attention on the issue. Websites such as *www.lifesharers.com* as well as personal websites have added the same dynamic as previously stated with living donation.

With Lifesharers, individuals volunteer to donate their organs to other Lifesharers members primarily and to nonmembers if there is no suitable member candidate. This allows possible donors to choose who will receive their organs when they die.

On the flip side of this method, there has been discussion over presumed consent. Currently in the US, individuals choose if they want to become organ donors by stating this information in the form of a living will, a donor organ card or an indication of consent on one's driver's license. Unfortunately, even if a deceased donor has indicated his or her consent to donate, final authorization is still requested from the donor's family.

With presumed consent, it will be presumed that the individual wanted to become an organ donor, unless there is documentation stating that he or she did not. This will eliminate the need to ask the family's permission and will allow the donor's organs to be recovered sooner.

The downside to the policy of presumed consent is that the altruistic characteristics of organ donation would be abandoned. Organ donation would no longer be "a gift of life"—it would be "an obligation to society."

CHANGES IN ORGAN ALLOCATION POLICY

Another area of concern regarding the bioethical concepts to increase the number of organs for transplant is the status of the organ allocation policy. Currently, every individual who is in need of an organ is placed on the OPTN waiting list.

This list is based on the individual need of the candidate. It is not influenced by the disease that caused the organ failure, the age of the candidate, nor the socioeconomic status of the candidate. If a deceased donor organ becomes available, the organ is allocated to the person highest on the list based on need, length of time spent on the waiting list and geographical proximity of the candidate to the donor.[7]

Should an individual with an emergent need but a shorter life expectancy receive an organ before someone with a longer life expectancy? Should individuals who have donated organs in the past be given preference on the list?

Should organs be given to individuals who are responsible for their disease processes, for example organ damage caused by smoking or alcohol abuse? Should organs be allocated based on age, geography or racial disparity? Should organs be

given to patients who are incarcerated? These are many of the questions being asked in the field of organ allocation.

UNOS is currently debating a new system of kidney allocation that would provide kidneys to those individuals who are expected to live the greatest number of years post-transplant.[8] One problem with this proposed system is that younger candidates will be given preference over those who are elderly.

The second problem is that with the emphasis on extended criteria donors, how many more years of survival will a 25-year-old recipient have with a kidney from a donor who is 60 years old? A possible solution is delegating organs from young donors to young recipients and organs from elderly donors to elderly recipients.

What is the justification for a shortage of organs in one geographical area and a surplus in another? Should these organs be distributed equally among everyone on the waiting list, regardless of geographical distance between donor and recipient?

A third problem involves geography. The *Los Angles Times* reported the story of two candidates.[15] A patient in New York was on the waiting list for a new liver for more than 10 years. Unfortunately he died on his 53rd birthday before receiving the organ. Another individual waited for four years for a liver and kidney in New York. Frustrated with waiting, he moved to Florida, where he received a new liver and kidney 14 days later.

With reports like this, one can see why an individual would move to a place where the waiting list is shorter, but what about people who are not able to relocate? What is the justification for a shortage of organs in one geographical area and a surplus in another? Should these organs be distributed equally among everyone on the waiting list, regardless of geographical distance between donor and recipient?

ALTERNATIVE METHODOLOGIES

Due to the current shortage of organs, there has been a new focus on utilizing alternative methodologies to increase the supply. Some of the methodologies, including xenotransplantation, cloning and the use of stem cell research, challenge some of our society's traditional concepts and practices and therefore become the subject of media attention and political debate.

With xenotransplantation, an organ is removed from a primate or porcine model and is transplanted into a human. Xenotransplantation first entered the bioethical area in 1963, when James D Hardy transplanted the heart of a chimpanzee into the chest of a cardiac-compromised patient.[14]

This was later followed by Leonard Bailey, MD, who transplanted a baboon heart into an infant with hypoplastic left heart syndrome in 1984. Left untreated, this congenital malformation causes mortality in the first month of life.[2] Though both of these grafts failed, research continued in the field of xenotransplantation and prevention of organ rejection.

Xenotransplantation lead the way to experimentation with other therapies, including cloning, stem cell research, islet cell research and the development of artificial organs. Unfortunately the bioethical debates concerning these modalities continue to hinder their progress.

Some of the ethical issues being debated include the experimental status of these procedures and any potential side effects that may occur, the psychological stress of receiving a cell or organ from an animal and the spread of retroviruses.[6] As for artificial organs, they still are used primarily as a temporary measure to preserve life until a human donor organ becomes available.

Consider the case of the infant who received the baboon heart. If this therapy had not been used, the chances were very slim of receiving a heart from a donor who was the same age and

weight; her only chance of survival was by xenotransplantation. As with human organs, a xenograft has the same potential for rejection. Is it not worth the risk, in order to provide a young infant a chance to live to his or her full potential?

CONCLUSION

The 21st century has become the age of discovery in the field of organ transplantation. There are increasing debates on how the US will be able to meet the need for the ever-growing number of candidates in need of lifesaving organs.

How can the country face this challenge? It can utilize marginal organs, living donors and new allocation methods. It can also utilize such controversial techniques as xenotransplantation or organs created via stem cell research. It can even give a financial reward to those who donate their organs.

Regardless of which technique is used, there is still a need to increase the number of deceased donors by educating the general public about the myths and facts involved in organ donation and transplantation. In addition, the country must also educate the growing number of individuals who are entering the various health professions. If health professionals do not understand this topic, then how will prospective donor families be convinced to donate?

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1. The number of living donors has increased _____ since 1988.
a. 45%
c. 71%
b. 56%
d. 84%

2. Which of the following is *not* a subject of current bioethical debate?
a. Organ donation should require authorization from a family member.
b. Split pancreas transplants should be performed only if the donor and recipient are related.
c. Performing surgery on a living donor violates the Hippocratic Oath.
d. The potential for psychological side effects makes xenotransplantation a risky option.

3. A living donor may donate all of the following except:
a. Kidney
c. Split liver
b. Lung
d. Cornea

4. US House Bill 710 and US Senate Bill 487 would…
a. Facilitate more paired exchange living donations
b. Guarantee life-time insurance coverage for donors
c. Eliminate the need for family authorization prior to donation
d. Create a standardized informed consent for living donors

5. Xenotransplantation first became the subject of ethical debate in…
a. 1958
c. 1972
b. 1963
d. 1984

6. _____ percent of transplant candidates die prior to receiving an organ.
a. Seven
c. Six
b. Eight
d. Nine

7. Organ allocation is influenced by…
a. Distance between donor and candidate
b. Age of candidate
c. Availability of an alternative, such as an artificial organ
d. Cause of candidate's organ failure

8. The number of waiting candidates compared to the number of donors is:
a. 5:1
c. 4:1
b. 7:1
d. 9:1

9. Which of the following are not considered marginal donors?
a. Children younger than 5 years
b. HIV-positive adults
c. Non-heart beating donors
d. Adults younger than 55 years

10. Cantarovich recommends all of these except:
a. Dispelling myths and superstitions
b. Educating the general public
c. Convincing young people that organ donation is an obligation to society
d. Improving insurance coverage

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Bioethics in solid organ transplantation

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3	❑	❑	❑	❑	8	❑	❑	❑	❑
4	❑	❑	❑	❑	9	❑	❑	❑	❑
5	❑	❑	❑	❑	10	❑	❑	❑	❑

Mark one box next to each number. Only one correct or best answer can be selected for each question.