Extension of Organ Transplantation:

Some Ethical Considerations

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Abstract

The concept of vital organ transplantation is critically analyzed by considering how traditional transplantation modifies the commitment to saving lives. Problems such as those associated with immunosuppression might seem to provide a compelling reason to oppose extension of transplantation to non-lifesaving situations. A closer examination, however, shows that immunosuppression does not present an intractable objection. For some organ transplants, such as the uterus, use of immunosuppression could be limited to the childbearing years. Complexities associated with assessment of quality of life are discussed using the example of hand transplantation. Assessment of success and functionality in a hand transplant is more complicated than it might appear at first. These complications suggest that monitoring and assessment should be a part of any extension of organ transplantation. Informed consent provides a limited, but important, component in justifying extended transplantation. Such justification, however, does not rest on patient autonomy, but on the reasonable prospect of benefit. Transplant programs considering an extension of traditional transplantation should develop formal protocols that include assessment of costs, benefits, quality of life, and the adequacy of informed consent.

Key Words: Ethics, organ transplantation.

SUCCESS IN THE TRANSPLANTATION of solid organs such as kidneys, livers and hearts has led to discussion of expanding the types of organs that are candidates for transplantation. This paper discusses the extension of transplantation to include organs that are not necessary to sustain human life. These so-called "non-vital" organ transplants, for example, hand, larynx and trachea, stem cell, and uterus, seem to move transplantation into a new dimension. Rather than organ replacements that are directly lifesaving, these transplants aim instead at enhancing the quality of life of recipients. How can such extension of organ transplantation be justified ethically?

Three considerations that are essential to the justification of traditional organ transplantation, namely, cost benefit, quality of life, and informed consent, are also relevant to the ethical justification of extending transplantation to include other organs. A review of these considerations does not reveal any insurmountable objections to the extension of transplantation. However, a full justification of extended transplantation must apply these considerations to each particular organ. Thus, analysis of the individual organ and specific clinical situations for which the extension of transplantation is proposed is needed for the proper application of cost-benefit, quality-of-life, and informed-consent concerns.

The Vital/Non-vital Distinction and the Ethics of Rescue

Organ transplantation has been fraught with controversy, including the high cost and difficulty of securing an adequate number of organs

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to meet the existing need (1). Extension of transplantation to include new organs that do not directly support a patient's life might seem ethically problematic in light of the continuing transplantation crisis. It might seem that the transplantation community should direct its energies toward solving the organ donation problem before embarking on an expansion of transplantation to other organs. A critic might argue that transplantation of new organs seems motivated by the economic needs of transplant programs that are confronting the limited availability of "traditional" organs. The critic might insist that extended organ transplantation would meet the economic needs of programs and health care institutions, rather than the needs of patients.

Underlying such criticism is the belief that the ethical obligation of the transplantation community is to increase the number of traditional organ transplants, because these organs are directly lifesaving. The goal of saving lives is given primacy and is seen as the overriding goal justifying the entire transplantation enterprise. Extending transplantation to organs that do not directly meet vital needs, therefore, would appear to be less ethically compelling. The risk associated with extending transplantation to organs that are not directly lifesaving is that such extension might compromise the ethical legitimacy of the entire transplantation enterprise and could ultimately adversely affect organ donation. In this view, if transplantation were to be extended to other organs, it would have to serve another purpose besides directly saving lives. As such, it would be perceived to be less ethically compelling and less worthy of public trust and support. Organ transplantation enjoys public trust, because it traditionally serves the ethically compelling goal of saving lives.

The belief that the goal of life saving is essential to the ethical justification and public acceptance of traditional organ transplantation rests upon the strongly felt need for a compelling response to the social ambivalence about organ procurement. A strongly valued goal, such as restoring basic physiological functions essential for life, is required to warrant the desecration of a corpse and the removal of organs. Traditional organ transplantation was based solidly on the ethics of rescue that permits exceptional efforts to be undertaken to save lives that are in immediate danger (2).

In situations in which individuals are at risk of death because of accident or other adverse event, the rescue ethic holds that the cost or other considerations that would argue against intervention can be overridden by the urgency of need. The rescue principle justifies the extravagant use of resources that would otherwise not be provided to individuals except when their lives are imminently at risk. The classic paradigm cases of organ transplantation, for example, for fulminant liver failure, hepatorenal syndrome, or end-stage congestive heart failure, clearly meet the requirements associated with this ethic.

Although such a rescue orientation imbues traditional organ transplantation, such requirements seem to have been necessary to overcome a deep social aversion to organ donation. It is undoubtedly true that some (perhaps even the majority of) transplants directly and immediately save lives, yet it is a mistake to conclude that transplantation can only (or primarily) be justified in terms of rescue. Traditional organ transplantation actually aims at a set of goals that is broader than rescue; it is guided by considerations of cost saving and quality of life in addition to lifesaving. These goals are essential elements in the full ethical justification of traditional organ transplantation, although they receive little attention in the characterization of transplantation in the public media. Yet the common practice of transplanting a kidney when dialysis is still an option is ethically justified not in terms of rescue, but on cost-savings and quality-of-life enhancement grounds (3). Recent work suggests that there is a growing tendency to place healthier patients on the waiting list for kidney transplantation (3, 4), based on the belief that transplant affords a better quality of life than chronic hemodialysis. Of course, transplantation might still reduce mortality (5), but it would be a mistake to think that the justification of kidney transplantation is primarily based on rescue. To say this is not to say that traditional transplantation of heart, liver, or kidney does not directly save patient lives, but only that saving life is only one element among a set of considerations involved in the ethical justification of transplantation.

It is widely agreed that use of a scarce resource such as a heart for transplant to an end-stage congestive heart failure patient with concurrent end-stage metastatic melanoma is not ethically justified, even though the heart transplant would itself be immediately lifesaving. Rather, such a transplant is not justified because the relative benefit that it would offer the patient, who is dying, is minimal. Organ trans-

plantation requires not just general ethical justification, but a specific justification in light of the particular organ and clinical situation involved. Patients usually do not receive a transplant at the precise time when the transplant would be most evidently lifesaving (5), because at that point a patient may be too sick to derive a full measure of benefit from transplantation. Simply put, the scarce resource could be put to better use in a relatively stable patient whose quality of life might be greatly improved following the transplant. Even if the organ graft were successful and the underlying physiological function restored to the aforementioned end-stage patient with congestive heart failure, it would not change the ultimate clinical course. Such cases help us to recognize that replacement of a vital physiologic function cannot be the core ethical justification of organ transplantation. For this reason, it would be a mistake to begin a discussion of extended organ transplantation by assuming the ethical primacy of lifesaving for organ transplantation.

Transplantation is justified if the life is worth saving. Being "worth saving" is used in this context in two different senses: first, in the sense of life being extended, to be sure, but, second, in the sense of enhancing the quality of the life being saved. In the classic cases of rescue, we are not in a position to know or predict with high degrees of confidence that the outcome will be acceptable. Committing resources in rescue involves a significant degree of hope. However, with greater knowledge or experience, a more selective rescue effort can be ethically justified. For this reason, the ethic of life saving prohibits vain efforts.

Organ transplantation is ethically justified only in situations in which there is an acceptable relationship between cost and benefit and in which it is reasonable to expect that an acceptable quality of life can be attained. Because organs are scarce and transplantation costs are high, selection of the best candidates is an ethically important aspect of transplantation. To be ethical, transplantation should maximize not only graft or recipient survival, but also recipient's well-being. Survival under seriously compromised conditions is not a justified goal of organ transplantation. Rather, attainment of a satisfactory quality of life is a necessary element in the ethical justification of transplantation. If the recipient's quality of life were less during the post- transplant than during the pretransplant period or it were otherwise unacceptable for the patient, transplantation would not be justified. These considerations strongly suggest that extension of transplantation to organs that do not directly save a life can be ethically justified if they favorably meet cost benefit and quality of life outcome standards. The ethical justification of programs to extend transplantation to new types of organs will thus need to address these concerns.

The ethical relevance of cost and benefit considerations to transplantation is especially evident in cases in which traditional organ transplantation is offered to patients who have less than urgent need. For example, patients who are not refractory to dialysis cannot receive kidney transplantation based on direct lifesaving alone since another life-sustaining treatment for end-stage renal disease is also available. Rather, kidney transplantation has been extended to such patients based on economic-cost and quality-of-life considerations (5–8). Data from other types of transplantation also shows that quality of life post-transplant is significantly improved (9–12). This point makes it clear that lifesaving alone is not the main ethical justification for organ transplantation, because cost/benefit and quality of life have an important role to play even in traditional organ transplantation. So, how might considerations of cost, benefits, and quality of life function in the ethical assessment of programs to extend transplantation to new organs?

Cost/Benefit and Quality-of-Life Considerations

One significant and common cost associated with extended organ transplantation involves the need for lifelong immunosuppression. Dependence on immunosuppression is an ethically significant consideration especially when the transplant does not directly maintain life, because it exposes the recipient to risks of infection, cancer, diabetes and other complications associated with immunosuppression that cannot be lightly dismissed (13, 14). Programs to extend transplantation will need to consider the risks and benefits of immunosuppression in terms of the specific organ and not rely on general inferences from the broad transplant literature. For some types of extended transplantation, immunosuppression poses unique challenges. For example, cyclosporine is known to cause peripheral neuropathy (13, 15). In the case of a hand transplant, attaining fine motor skill and sensory awareness is an essential part of a successful hand transplant (16–19), but cy-

closporine may lessen the chance of achieving a satisfactory post-transplant experience.

Not every type of extended transplant, however, poses a lifelong immunosuppression risk as do traditional organ transplants. For example, transplantation of a uterus primarily for childbearing would not incur the risks associated with lifelong immunosuppression if the patient accepted a post-partum hysterectomy. In this case, the risks and benefits associated with immunosuppression could be limited to the prepregnancy and pregnancy periods. Although use of immunosuppression would be relatively short term, the risk assessment would also need to include potential adverse effects on the pregnancy itself. Concern about the risks of immunosuppression, however, have to be placed within the context of known evidence about quality of life and known risks of chronic immunosuppression. Literature on heart, liver, and kidney transplants indicates that quality of life remains high after transplantation, even approaching the normal range (9, 11, 12). Whether immunosuppression usage in extended organ transplantation will lead to different outcomes is unknown.

To illustrate how these considerations function in the ethical assessment of extended transplantation, we turn to the case of hand transplantation (20, 21). Ethically, the cost and benefits of the transplant would have to be weighed against the functional and esthetic qualities of available prostheses. Technological developments promise even further improvements in prosthetic function, cost, and acceptability by patients. That said, a prosthesis is not a human hand, so the desire for a "natural" hand is understandable. This desire has to be analyzed to see its full ethical import. Complex judgments need to be made about the benefits and functions of a prosthesis versus a transplant in light of the costs.

First, the hand is an external organ, so its esthetic qualities as well as its functional capability are important. Beyond the usual considerations of blood and HLA matching, selection of a hand for a particular recipient would have to match, among other things, the size, shape, and skin tone of the other hand. Consideration of the appearance of the "organ" is unique to this form of organ transplantation. Second, the functional capability of the transplanted hand has to be analyzed not only in terms of objective measures, but also in terms of how the transplant is experienced by the recipient. The recipient's own subjective evaluation of the graft's function in the myriad activities of daily living is crucial in this assessment. A graft that might not perform better than a prosthesis in grasping, nonetheless, might confer significant benefit on a patient if it afforded sensory awareness. Similarly, a graft that performs significantly better than a prosthesis might still be experienced as problematic if it did not provide a suitable range of sensory input. Restoration of the full range of sensation characteristic of the normal hand is a complex and possibly elusive goal for hand transplantation. An ethical prerequisite for undertaking hand transplantation is the development of a program to assess the restoration of sensation and the effect of the transplant on the patient's quality of life.

Philosophical textbook discussions of organ transplantation often rely on a stock example of transplanting a hand to a concert pianist. The classic use of this example is to argue that transplantation is justified based on the importance of the hand to the individual. Unfortunately, these textbook discussions seldom consider the sensory, physiological, or functional complexities associated with a composite organ like the hand. The hand must be innervated in such a way that something approximating normal sensation and movement is possible. Experience with replantation of severed hands has shown that reattaching a severed hand cannot always achieve the degree of functionality of the pre-injury hand (17, 22–24). It is possible that even the most technically successful hand transplant would not provide the idealized restoration of performance dexterity and associated sensory capacities that are assumed in the concert pianist's example.

If functionality were not accompanied by adequate sensation, the hand might not provide better service than a prosthesis. A prosthesis can certainly be damaged, but a hand that lacked the protective sensation of heat or pain would be susceptible to myriad types of injury that could ultimately affect the health of the patient. Such injuries would not be limited to the hand alone, but could affect the entire body, for example, through infection. Experience with replantation, that is, reattachment of a patient's own severed hand, has shown that restoration of sensation is critically important to the acceptance of the graft by the patient (22). Thus, the desire of the recipient to have a "natural" hand may be even more difficult to achieve when the hand is not perceived as the patient's own. The hand, like the larynx, is a communicative tool that is integral to the person's status as an agent

in the world. The hand is unlike other organs, because it is in the world as a perceived object, yet it is also a sensory organ of the person. Being in the world, it allows the person to contact things and other persons. In touching, the hand allows the person to sense the properties, surface texture, hardness, density, or temperature of objects. In touching, the hand also communicates with objects. A hand can slap, hit, or caress. It can itself shape things in the world and, so, remake the things into new forms. We also rely on the uniqueness of the hand as an individuating marker; for example, fingerprints are used to establish the identity of individuals.

A hand that is not fully functional, that is not esthetically satisfactory to the recipient or the recipient's significant others, or that cannot provide the sensory nuances that are so important to the everyday function of a hand may create serious psychological burdens and frustrations that are not encountered in other types of transplants (23). Such outcomes might significantly diminish the quality of life after transplantation. Understanding and assessing the full functionality of the hand and the costs and benefits associated with its transplantation thus turns out to be much more complex than understanding the functions that a liver or heart transplant replace.

This line of analysis suggests that while the consideration of costs, benefits and quality of life are complex in extended transplantation, they do not provide formidable ethical reasons to oppose such transplantation. In fact, the discussion suggests that the ethical justification of extending organ transplantation is possible if sufficiently compelling evidence or arguments can be developed, on an organ-specific basis, to answer the kind of questions being raised. Some considerations, such as the risk of rejection and the complications associated with immunosuppression, are universal, but their ethical salience, too, will vary from organ to organ. Ethically responsible programs that extend transplantation to new organs will identify and address these elements. Such assessment is important both to justify beginning a program and to responsibly carry it out.

A degree of caution is justified, because the cost and benefits in situations of true innovation are somewhat speculative. It is unclear, for example, how having one's own voice will be accepted by the recipient of a larynx transplant if that voice is not experienced by self or others as his or her own. In other words, because a voice has a distinctive character and aural quality, acceptance and adjustment will be necessary. It is unclear whether recipients and their significant others will accept or adjust to the new voice, but the report of the first laryngeal transplant is that the recipient's quality of life has immeasurably improved (25). The experience with replantation of severed hands indicates that significant rehabilitation is necessary before functional abilities are regained (26–30), including the patient's ability to adapt to the demands of rehabilitation, to accept setbacks and slower than hoped-for progress, and to expend the effort required to make the transplant a success. Whether programs can adequately address these concerns is an empirical question, but there are no significant technical impediments. Programs extending transplantation into these new areas should be conducted under protocols that provide for ongoing assessment of quality-of-life outcomes.

Informed Consent

Those who would give autonomy a central place in bioethical considerations often take the position that informed consent is the central ethical standard for medical decision making. Consent contains two distinguishable functions that are often overlooked: authorization and legitimation. In giving consent, a patient provides permission and thereby authorizes the health professional to perform the procedure. Ethically valid permission depends on adequate disclosure of information relevant to the decision. This aspect of consent underlies the well-recognized obligation of physicians to disclose risks, benefits, and alternatives to patients. In some interpretations, in fact, the doctrine of informed consent is epitomized in the physician's obligation to disclose information. The agreement of the patient simply provides permission.

Other interpretations provide a richer understanding of the patient's informed consent. After being provided with relevant information, the patient is allowed to consider the proposed treatment and to judge whether it comports with his or her personal values, beliefs, or preferences. In the act of consenting, a patient not only authorizes treatment, but also provides an ethical justification for the treatment. In this view, the informed consent of an autonomous person legitimates the procedure or intervention. This legitimation function of consent can provide the ethical justification for extended transplantation. So long as full disclosure of risks and benefits occurred and informed con-

sent was obtained, the extension of transplantation to new organs would be justified ethically. This interpretation gives informed consent considerable ethical weight. Even if prospective recipients are enthusiastic and would accept transplantation after being fully informed, this focus on patient autonomy constitutes an ethically inadequate approach to the extension of transplantation services. Such a strong interpretation gives informed consent too much weight, thus slighting other considerations.

Central among the other ethical considerations that balance autonomy considerations are the professional obligation of beneficence and the corollary of minimization of harm, core values that define medicine as an ethical practice (31). The functions of authorization and legitimation provided by informed consent operate within the normative framework of the physician-patient relationship. Within this relationship, there is congruence between the patient's goal of regaining health and the physician's professional commitment to patient well-being. The professional commitment to beneficence is grounded in the professional competence to practice medicine. Traditional professional ethics, however, were based not only on the personal commitment of physicians to benefit their patients, but also on the scientifically derived professional knowledge that assures a beneficial outcome. Extension of medicine beyond these standards, however, raises serious ethical questions that are not adequately answered by appeal to the principle of patient autonomy alone.

Illness makes patients vulnerable and they might consent to interventions that impose undue risk or burdens. Their vulnerability remains even if they receive the fullest disclosure of risks and alternatives. For this reason, even if coupled with informed consent, the desire for (and consent of patients to) transplantation of organs such as hand, larynx, or uterus, is an ethically incomplete basis for justifying programs to extend transplantation. Although individuals may be willing to undertake a risk, it is ethical to subject them to it only when the benefits are reasonable and consistent with the goals of medicine.

Considerations of cost, benefits, and quality of life provide an analytical framework for medicine's obligation to expose patients to risk only when the potential benefit is acceptable. The obligation of transplant programs, like the professional ethical obligation of individual physicians, is to pursue courses of action that have a reasonable basis for enhancing or restoring patient welfare. In this view, respect for patient autonomy is balanced by the professional judgment that the risks associated with extended transplantation are worth undertaking in light of the potential benefits to be achieved. Beneficence can be sacrificed if transplant programs are extended primarily in response to patient demands. Even if they are motivated by compassion and a desire to alleviate the suffering of patients from conditions like Rokitansky's syndrome or the loss of voice resulting from laryngeal carcinoma, the decision to extend transplantation services requires a broader ethical justification.

Given the uncertainties associated with the extension of transplantation, informed consent will exert its strongest justificatory force only when transplantation is extended under the banner of investigation, rather than clinical practice. Innovation, however, demands an even wider range of considerations than cost, benefit, quality of life, and informed consent. To be ethically justified, innovation must be undertaken responsibly, which entails three further considerations. As described by Francis Moore, responsible innovation in medicine rests on the adequacy of the scientific background upon which the procedure is based, the skill or experience — the "field strength" — of the team performing the procedure, and the ethical climate of the institution itself (2, 32). While the first two elements are significant, Moore stresses the third, noting how economic motivations can sully judgment (2). The ethical assessment of the financial motivation to extend transplantation can be addressed by seeking review and advice from the institution's ethics committee or other body charged with addressing organization ethics.

Summary

The reliance on cost/benefit considerations in the ethical justification of extending renal transplantation to patients who are not refractory to dialysis, and therefore not immediately in need of rescue, provides an important analogy for thinking about extending transplantation to new organs. Cost/benefit considerations and quality of life have an ethically important function in justifying the extension of transplantation. Such justification, however, must involve an organ-specific ethical assessment. Such evaluation should be delineated in a formal protocol with the involvement of profes-

sionals with appropriate experience and training in the design, implementation, and evaluation of the program. The protocol should identify specific inclusion and exclusion criteria, and include provisions for data collection, and ongoing assessment and monitoring of medical and psychosocial risks, complications, and adverse events, as well as assessment of outcomes. The scientific basis for extending transplantation should be strong and the team or program should possess appropriate competence and experience in transplantation. Finally, the program and institution should critically evaluate their own motives for wanting to extend transplantation, because institutional and program self-interest can corrode the complex processes required to extend transplantation responsibly.

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