Ethical Issues in Cardiothoracic Surgery

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Introduction

If one defines ethics as the study of conduct and moral judgment, it is not hard to understand Pellegrino and Relman's statement that "medicine is, in essence, a moral enterprise" [1]. We, as physicians, strive to do the "right" thing for our patients, yet, as anyone who has practiced medicine has realized, controversies emerge on a daily basis and, on longer time frames, techniques and practices constantly evolve making it difficult to always know what is "right." Given the fact that what we do often has negative as well as beneficial effects on our patients, many controversial areas in medicine can be seen to have an ethical component. One can easily extrapolate this to the field of surgery where we are enjoined to use our surgical skills and knowledge for the benefit of our patients (beneficence) and with a minimum of associated harm (non-maleficence). Similarly, we are expected to do this after we have obtained informed consent (Respect for Persons) and to treat all patients with respect and dignity (Justice). These four ethical principles, as defined by Beauchamp and Childress, form a useful, but not exclusive, framework for examining ethical issues pertaining to the field of surgery [2]. The specialty of cardiothoracic surgery shares these moral principles and related ethical challenges with other branches of surgery yet must deal with them in contexts unique to the field. The goal of this chapter is to identify some of the ethical challenges that, while perhaps not unique to cardiothoracic surgery, are currently topics of current controversy.

Cardiothoracic surgery is a field of high technical complexity and one which is associated with substantial benefit to patients—albeit at the cost of significant risks. The field is diverse and encompasses general thoracic surgery, adult cardiac surgery, and congenital heart surgery and includes subjects that traverse all three areas, critical care and transplantation being two such examples. As with any high-risk area within surgery, certain topics have clear ethical dimensions that have been extensively covered in this and other works [2–4]. While the context and underlying disease are different depending on whether one is dealing with an adult cardiac surgical patient, a general thoracic surgical patient, or congenital heart patient, the concepts of balancing beneficence, the prolongation of suffering, and honoring the wishes (or presumed wishes) of the patient regarding prolonged ICU care and predicted outcomes are concepts that have been extensively written about [5–7].

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Ethical Frameworks

In many clinical scenarios in which the surgeon is given a choice of action, the morally correct one is obvious. Although a duty-based ethical framework (respect for autonomy, beneficence, non-maleficence, and justice) may not be overtly considered, experience and common morality make it simple to pick the right moral choice. In other situations, the available solutions to a problem face one of the duties or virtues to another. For example, in a situation where withdrawal of care is being considered, one may have to prioritize autonomy over beneficence. In other situations, such as allocation of organs for transplantation, justice for a group of patients may prevail on beneficence or autonomy. Other situations arise where the duties-based theories of morality are not helpful and one may have to utilize an alternative theory such as consequentialism. Consequentialist theory asserts that it is the outcome more than the intention that determines what is right. One variant of this is utilitarianism in which the morally superior choice is that which creates the greatest good for the greatest number of people [8]. While utilitarianism has its drawbacks—notably difficulties in quantifying "good" and requiring one to be able to predict future effects of one's actions—a clear example of the practical application of this theory is the lung allocation score used for allocation of lungs for transplantation among patients on a waiting list. In this methodology, the expected gain of life is balanced against the loss of life while awaiting an organ and lungs are allocated to maximize life-years gained—a quantifiable and reasonably predictable "good."

Limitations on Care, Withdrawal of Life-Sustaining Care, and Futile Care

As referred to above, there are times when one duty conflicts with others and the surgeon has to prioritize these duties. One such example that has come up in the context of cardiothoracic surgery has arisen when a surgeon agrees to take on a high-risk operation only if the patient (and family) agrees not to withdraw support within a certain window following the surgery. While no surgeon wants to waste his or her time performing a futile operation, it is frustrating to take on a long and complex operation, for the patient then to have a predictable but potentially reversible complication and then to have the patient's family withdraw support only a few days into an expectedly long postoperative course. While a surgeon may want a window of time to get the patient through the procedure, is it appropriate to request, or even require, such a window of time as a contingency of taking on the case? Is such a request coercive? Or, if the family originally agrees to the stipulation, can they change their minds later?

Although there may be certain circumstances where attempting to place limitations on the patient's ability to withdraw care may be appropriate, one of the primary duties of the surgeon is to act on behalf of the patient—respecting his or her choices and acting accordingly. While a surgeon may request a certain therapeutic window and he may go to significant lengths to justify his position, ultimately it is the patient's choice, and the surgeon has the options of either agreeing or not performing the operation and allowing the patient to go elsewhere. Obviously, for this latter choice to be appropriate, there must be an alternative surgeon who would agree to the patient's stipulations, and the situation cannot be an emergency—a situation where forcing certain stipulations would clearly be coercive. Nonetheless, in an elective situation, the patient and the surgeon enter into a voluntary agreement and neither the surgeon nor the patient is forced to accept the other's stipulations.

What, then, happens if the patient agrees to a surgeon's requirement for a window of care and then later changes his mind, or the family wishes to withdraw care sooner than planned? The two are different situations with the first being easier to address: assuming that the patient is competent to make decisions, if the patient changes his/her mind and opts to withdraw care, this is his/her prerogative under the principle of autonomy. While frustrating to the surgeon, it is rarely

appropriate to force care upon an individual who refuses or declines it. It is more complicated if the family wants the surgeon to change course. While the family may have the legal ability to make healthcare decisions when an individual is unable to do so, the surrogate decision-maker generally does so under the doctrine of substituted judgment, i.e., deciding what patient would decide if he/she could make the decision himself/herself [9]. In general, if the patient is unable to provide consent, the caregiver (surgeon) needs to abide by the decision of the family (or designated healthcare proxy). The surgeon may argue that the patient agreed to a course of treatment and there is no reason to change plans, but unless there is a reason to suspect treacherous activity on the part of the family or surrogate decision-maker, the surgeon generally must respect those decisions made on behalf of the patient. While the surgeon can attempt to convince the patient or healthcare proxy to "be more reasonable," "give the patient some more time," etc., ultimately, it is not the surgeon's choice when to withdraw care—it is his/her job to work on behalf of the patient and respect the patient's decision.

A similar set of ethical concerns arises when a surgeon is asked to do an operation that he/she thinks is likely futile. Some situations are relatively straightforward: a patient requests a lung resection in an advanced stage of disease and for which there are other or, in fact, better alternatives. In this case, the surgeon is not forced to offer an inappropriate procedure and can justifiably turn the patient down. Cannons of professionalism do not include the statement that "the customer is always right" and, as professionals, we are obligated to use our best clinical judgment on behalf of the patient. Other situations are less clear. For example, consider a situation in which a patient has an aortic dissection and an unclear neurological status. Outcomes of aortic repairs in the setting of severe neurological damage are extremely poor, and it may well be appropriate not to offer an operation in such a setting [10]. But there are times when the neurological status is unclear, sometimes due to the administration of sedatives or other impairing medication. In such settings, it is probably best to err on the side of beneficence and proceed with surgery.

Another situation is even more unclear: that of recurrent endocarditis in a drug-addicted patient who has repeatedly gone back to intravenous drug use and who may have no intention of changing his/her habits. Surgery in this setting will likely not be beneficial and probably has a high chance of causing further harm. Arguably, not operating also has a high probability of harm, and surgery is likely the only, even potentially, effective course of treatment. Is it ethical to turn the patient down for surgery under these circumstances?

Empirically, surgeons have gone both ways on this: some may feel obligated to offer an operation on the grounds that failure to do so is tantamount to a death sentence; others feel justified in not offering an operation that is both unlikely to be helpful and fails to address the core issue of intravenous drug addiction [11]. In a setting of fixed resources, one could make an argument on the basis of justice—that failure to offer an operation is justified in that enormous amounts of resources will go to an individual with an almost certainly poor outcome and, as a result, not be available to others. In the situation where there is no limitation of resources, one could still argue that some sort of patient buy-in—a willingness to, or interest in, giving up intravenous drug use, for example— could be required by the surgeon prior to entering into an agreement to undertake the high-risk procedure. As with the earlier case though, if there is no other surgeon available, the refusal to take on a life-saving operation stands on more tenuous ethical grounds. One could argue that surgery is not in the best interest of the patient, i.e., that the outcome would be the same with or without surgery or even that the outcome of debilitating neurological impairment may be even worse from the patient's perspective than death and that failure to accept this risk changes the matter from an issue of beneficence/non-maleficence to one of patient autonomy. Finally, one could assert that the patient's repeated use of intravenous drugs puts the onus of responsibility on the patient, not the surgeon. Such an argument may be reasonable in the rare situation where the patient was told, on a prior operation, that "this is the last time we are going to operate on you."

Should a surgeon refuse to operate on a patient, it is reasonable to expect him/her to assist the patient in finding another surgeon who may not feel similarly encumbered in offering what is likely to be an operation with a relatively low long-term benefit.

Surgical Outcomes Databases

In both of the above cases, the neurologically impaired patient with an aortic dissection and the drug addict with endocarditis, the end result of the operation is likely to be death of the patient. While obviously not what the surgeon or the patient had hoped for at the outset, this is, unfortunately, a potential outcome of any high-risk area of medicine or surgery. Over the past two decades, quantitative assessment of surgical outcomes has gained increasing importance in not only determining where patients go for care and how value in healthcare is determined but also reimbursement—at least at the hospital level. While self-improvement has long been part of the professional ethos, measurement of surgical outcomes, the development of outcomes databases (National Surgical Quality Improvement Program (NSQIP), the Society of Thoracic Surgeons Cardiac Database, and others) as well as improved quantitative methods for data analysis have been associated with an increasing focus on quality of care [12, 13]. While offering a firm basis for quality improvement, the use of such databases can lead to ethical controversies.

The STS (Society of Thoracic Surgery) Cardiac Surgery Database began in 1989 as an initiative designed to improve quality and safety in adult cardiac surgery. As of January, 2018, the initiative has expanded to include adult cardiac surgery, congenital heart surgery, general thoracic surgery, and, most recently, mechanical circulatory assistance (typically ventricular assist device) outcomes. The database has records of over six million patients, is audited, and has become an invaluable resource for both quality improvement and research.

While detailed outcomes results of a specific program are typically only made available to that program, certain elements are made publicly available, with appropriate qualification, on a voluntary basis. The degree of specificity of this publicly available information varies with the different specialty databases, but the aim is to benefit patients by creating transparency in outcomes using audited, credible, and risk-adjusted data.

Early attempts at public reporting of surgical outcomes did not adjust for surgical risk [14]. As a result, surgeons who took on cases with higher-risk profiles and had higher expected (and actual) mortality rates looked worse in the public eye. Risk-averse surgeons could appear to have better than expected results simply on the basis of patient selection. A result of such a system would be to encourage aggressive case selection by turning down more complex, high-risk cases and transferring them to other, less risk-averse institutions. The ultimate effect could be to deny potential benefits of surgery to all high-risk patients—a clear affront to the principle of justice. More recent efforts at public reporting have involved risk adjustment that, while not perfect, substantially decreases the incentive of cherry picking—at least from the standpoint of public reporting of outcomes.

Different databases report results back to the participating programs in different formats. The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP), for example, reports mortality and a number of domains of morbidity as a risk-adjusted observed to expected (O-E) ratio and a decile ranking in comparison to all other participating institutions. Some specific indexes of morbidity and mortality are made publicly available for this. The STS Cardiac Database has created robust statistical models of several operations and reports outcomes as both observed to expected (O-E) ratios as well as raw occurrence frequencies. Results of an individual institution's outcomes are presented in comparison to outcomes of all participating institutions as well as institutions of similar size and case composition—defined as "like" institutions. Additional statistical manipulation and creations of "star ratings" were developed to complement the increasingly common availability of publicly available outcome data as reported

data in *hospitalcompare.gov*, *US News and World Report*, and *Consumer Reports*. "Star ratings" combine morbidity and mortality, as well as other quality indices, with 2-star institutions providing risk-adjusted outcomes within two standard deviations of the mean, and 1 and 3-star ratings being associated with results that are statistically significantly lower or higher than the mean. Institutions can choose to have their star ratings made public or may choose to use them only internally.

Since outcomes databases, such as STS and NSQIP, were established as quality improvement tools, rules governing use and dissemination of the data are incorporated into "data use agreements" (contracts, essentially) that generally limit use of the data for institutional marketing purposes. Although the surgeons themselves are technically responsible for use of their institution's data, it is not difficult to imagine use of star ratings and publicly available O-E ratios to be used to directly compare outcomes between institutions. While STS rules specifically prohibit or limit such uses, once data gets into the public realm, it is increasingly difficult, if not impossible, to control data use and dissemination.

While certainly better than non-risk-adjusted models, risk-adjusted outcomes take both outcomes and case mix into account. As such, simple comparison of two O-E ratios of two institutions' results can be misleading, i.e., appearing to favor one institution over another, yet may be due solely to differences in case mix and not to differences in quality. For example, imagine a situation where one institution that does a large number of noncomplex procedures and no complex ones yet has a similar or even better O-E ratio than an institution that does a significant number of complex cases. A statistically naïve patient with a complex condition could easily be misled into thinking that the institution with a slightly better O-E ratio but focuses on less complex cases also does well with more complex ones.

A related, although somewhat niche, issue is the whole concept that one operation can be used for several underlying diagnoses and outcomes databases may look only at the outcome of a specific operation—not an outcome of an operation for a specific underlying diagnosis. For example, pulmonary lobectomy, while most commonly performed for cancer, tends to have higher complication rates when done for infectious causes. Since diagnosis may not be taken into account in a risk model, an institution that has a patient bias toward infectious lung disease may appear to have a higher than expected morbidity and mortality when, in fact, the worse outcomes are due solely to the underlying diagnosis and not poor performance on the part of the institution or surgeon. Another example, from the area of congenital heart surgery, would be to present risk-adjusted outcomes for a Fontan procedure, a procedure which is performed for the correction of hypoplastic left heart syndrome and tricuspid atresia, as well as other congenital anomalies. If (a) outcomes are clearly worse for the one of these diagnoses, (b) the risk model does not take this into account, and (c) two institutions have marked differences in case mix, there may appear to be significant differences in risk-adjusted outcomes even though these may be due solely to case mix differences and not to actual quality. While one may simply attribute such an occurrence to shortcomings of the risk adjustment models, direct comparisons of such data can be misleading—particularly to unsophisticated audiences.

The last issue related to databases is that not all institutions participate in them. While the STS Adult Cardiac Database has near 100% participation, in part this may be because there are mandatory regulatory reporting requirements of many of the database elements in many states. Parenthetically, such regulatory requirements do not apply to congenital cardiac surgery or general thoracic surgery, and perhaps as a result, participation in the STS Congenital and General Thoracic databases has, historically, not been as robust [15]. If participation is selective, one then wonders whether the public can truly rely on these databases to provide true comparative data. None of the above, however, should be construed to diminish the remarkable value of the STS Database as a tool for institutional quality improvement.

Innovation

As with many areas of surgery, cardiothoracic surgery has witnessed significant technological innovation over the past several years. Cardiac surgery has seen percutaneous coronary intervention change both the volume and clinical presentation of coronary artery bypass grafting (CABG) [16]. Patients are now older, have more comorbidities, and have had more previous interventions. In the area of valve surgery, transcatheter aortic valve replacement (TAVR) has resulted in a dramatic drop in what are now termed "surgical" aortic valve replacements (SAVR's), and the technology of minimally invasive mitral valve surgery is developing at a rapid pace. Cardiac surgeons must work collaboratively with interventional cardiologists, and the phenomenon of a "heart team" has developed. The aim is for patients to profit from the care of a skilled team of physicians and associated practitioners—all with improved outcomes and, hopefully, lower costs. Duplication, or overlapping, of services can be minimized, financial incentives can be based on overall outcomes and not individual productivity, and patient outcomes can be prioritized. Such a system, however, requires significant restructuring of the traditional fee-for-service and volume-based payment/reimbursement strategies. New strategies for inter-specialty collaboration, which will require trust and fair distribution of gains and liabilities, must be developed.

Innovation is not limited to cardiac surgery however. General thoracic surgery has seen a dramatic shift from large open cases to minimally invasive or VATS (video-assisted thoracic surgery) techniques. In fact, recent STS Database reports suggest that up to 60% of lobectomies (at STS Database participating institutions) are now done using minimally invasive techniques [17]. The increasing use of surgical robotics has complicated this progression from open to less invasive surgery, and it is unclear whether its use is also associated with patient benefits.

The use of the robot is associated with a number of other ethical issues such as how to teach residents robotic techniques, how does a surgeon obtain "informed" consent for the initial procedures with which he has little experience, and how does a surgeon ethically replace a procedure with which he/she has a great deal of experience with one where he/she is on the early stage of the surgical "learning curve." Finally, why should the patient pay the price of longer surgery, potentially unknown risks, and little in the way of proven benefit? Is the patient truly informed of these issues when he or she is asked to provide consent for the procedure—or is the consent really a matter of "entrustment" as McKneally has described [18]?

In the area of cardiothoracic critical care, the increasing use of extracorporeal membrane oxygenation (ECMO) has generated a number of ethical and practical issues [19]. Some of the reasons for the increased use of this technology is attributable to general improvements in outcomes of ECMO in critically ill adults in general but may also be attributable to increasing ease of initiation. Early models of ECMO required surgical cannulation of large vessels (internal jugular vein and carotid artery), assembly of complex devices incorporating separate pumps and oxygenators, and essentially meant having a patient on bypass in the ICU. Technological innovations have resulted in single cannulas (for blood return and infusion), intervention on only the venous side of the circulatory system (veno-venous ECMO vs venoarterial ECMO), more efficient oxygenators, lower requirements for anticoagulation, and small, portable, less complex devices. The increased use of ECMO technology has resulted in several ethical issues: (1) those related to who should go on ECMO, (2) the costs and resource utilization required by the technology, and (3) discontinuing ECMO [20].

Ethical issues related to the initiation of ECMO include who should go on ECMO, who should make this determination, and how can informed consent be obtained. While ECMO has been termed a "bridge to survival," if cardiopulmonary failure is irreversible, ECMO becomes a "bridge to nowhere." Since ECMO is often initiated urgently, if not emergently, how then is one obtain informed consent and present a balanced view of risks, benefits, and alternatives to a patient, or family of a patient, in extremis? Likely

posed as "this is the only way to save the patient's life," critical issues related to outcome, such as withdrawal from ECMO, and risks of stroke and bleeding are probably covered in a cursory fashion—if at all.

In terms of maintaining patients on ECMO, the substantial resources that are utilized request special consideration. Because any single institution must allocate its resources efficiently and equitably, it is incumbent on institutions that have ECMO services to define clear and strict criteria for who and how many patients can be put on ECMO. Such criteria clearly involve balancing the goals of beneficence and justice. For example, if a hospital with the capability of running two patients on ECMO at any given time already has two such patients, should high-risk cardiac surgical or catheter laboratory (cath lab) cases— which may eventually require ECMO—be delayed until a time when additional ECMO capability is available. In terms of justice, is it appropriate to tie up several intensive care unit (ICU) beds for patients on ECMO and end up with a situation where resources to accomplish this cannibalize from other services that would then be underresourced and not capable of appropriately caring for their normal caseload [19].

The ethical issues of withdrawing ECMO, while often qualitatively similar to withdrawal of other life-sustaining treatments (e.g., dialysis, mechanical ventilation, and enteral feedings), may, however, be unusual in that the patient may be awake, alert, and able to participate in the decision process. It is well documented that complications related to ECMO increase with duration of the treatment, and it is also well documented that prognosis after discontinuing ECMO depends on adequate recovery of cardiopulmonary function. Emotionally and ethically charged situations may arise when a patient who has been placed on ECMO shows no underlying cardiopulmonary improvement over a reasonable time frame and could continue on ECMO for a prolonged period of time with no reasonable chance of recovery. It would seem that discontinuing ECMO would be qualitatively similar to discontinuing tube feeds, dialysis, or mechanical ventilation—balancing beneficence and nonmaleficence: are we prolonging life with the technology, or are we prolonging death? Many difficult questions arise: At what point is nonrecovery guaranteed? Is high-risk transplantation an option? And how does one deal with the situation where the patient is awake and fully aware that discontinuing ECMO will likely result in a rapid demise? Is this the same as discontinuing mechanical ventilation in a patient with multisystem organ failure and delirium? While some care withdrawal issues are unique to ECMO, Courtwright has pointed out that the majority of ethics committee consultations arising in the setting of ECMO withdrawal resemble traditional concerns about withdrawal of life-sustaining treatments [21].

Ethics in Cardiothoracic Surgical Education

Ethical issues related to resident education cross all subspecialties within cardiothoracic surgery—although they exist primarily in academic institutions and less so in community or nonteaching environments. While this is no different from other branches of surgery, resident education must be balanced with duty to the patient. In the teaching environment, faculty surgeons have clear responsibilities to both the resident and to the public at large—for if teaching is ineffective, the future of other patients, and perhaps the specialty as a whole, is at risk. On the other hand, no patient is likely to be willing to undergo a substandard operation for the benefit of some future hypothetical patient—particularly when the price paid of a substandard operation in cardiac surgery is high. Arguably, this problem is greatest in the pediatric cardiac surgical population where the operations are the most challenging, the cost of error is the greatest, and the training is the most protracted [22].

How then do cardiothoracic surgeons balance these competing missions? And how much are patients aware of these trade-offs and the roles of trainees. While again, this is not qualitatively different in any other area of high-acuity/high-risk

surgery, cardiothoracic surgical residency training programs in the United States are having to adapt from 2-year programs—where entering residents who have already completed residencies in general surgery are reasonably well prepared technically and intellectually to do cardiothoracic surgery—to integrated 6-year programs, where junior residents may be only days out of medical school. In the former model, cardiothoracic surgical faculty may assume some substantial baseline knowledge and technical skill level; in the new training model, such technical expertise cannot be assumed, and the balance of teaching, oversight, and independence is more complex.

Another ethical area related to the teaching of residents, as well as the use of non-physicians in the operating room, concerns the degree to which patients are aware of the roles of these individuals. While there is little in the literature indicating how much patients understand about the role of residents and physician extenders, Kent demonstrated that patients have both strong and highly varied opinions on how much independence trainees should be permitted in the operating room [23]. Furthermore, while consent forms often make note of assistants in surgery, the specific role of these assistants is generally not apparent. In 2017, the Federal Government of the United States considered the requirement that patients be informed of the role of all individuals involved in the operation—including their names and specific roles. Fortunately, this was aborted but largely because it was argued to be highly impractical, not because of what was better or worse for the patient. To be more specific, when consent is obtained well in advance of the case, the patient can better participate in the decision process. On the other hand, at that time, it is often impossible to know which resident or advanced practice provider (nurse practitioner or physicians' assistant) would be available for at the operation. If the consent is obtained immediately before the procedure, the ancillary staff may be known, but there are great, potentially coercive, pressures on the patient to sign the consent form. While it would be possible to get a second, or amended, consent with the added information, changing teams at such a late date would arguably be impractical at best and potentially harmful at worst.

Another controversial area that is related to education and that has engendered controversy recently is that of the role of broadcasting live surgery in professional educational conferences. More specifically, the controversy is whether live surgery should be permitted as an educational tool: the pros being that live surgery has historically been used to train colleagues and that there is a value to observing both real-time decision-making and the results, either good or bad, of such decisions. The cons include (1) the potential for the surgeon being distracted by an audience, (2) the possibility that the presence of a live audience may influence the conduct of an operation and direct it toward an optimal educational outcome instead of optimal patient care, and (3) the possibility that audience enthusiasm is based more on a voyeuristic basis—the surgical equivalent waiting for a crash in a NASCAR race—rather than an educational one. There is also the concern that while audiences in professional educational sessions are reasonably well regulated, people in the audience may have nonprofessional relationships with the live patient and may witness either an untoward event or nonprofessional behavior on the part of the audiences. Individuals and organizations that oppose live surgical broadcasts assert that edited videos would provide as much information—generally in a tighter, more efficient time frame—than a live broadcast that the surgeon can devote his full attention to education, even pausing the "operation" to address a technical matter, and that there is no possibility of the surgeon diverting his full attention from the patient at the time of surgery. Needless to say, whether the operation is recorded or broadcast live, the patient must be apprised of the educational nature of the modifications to the standard procedures and be given the opportunity, without coercion, to agree or disagree.

Professionalism

The final area to address involves the topic of professionalism; in particular, the ethical issues related to the increasing incidence of cardiotho-

racic surgeons being employed by hospitals and large medical organizations rather than the previously more common model, at least in the United States, of being in small group practices. Both hypothetical and real cases have anecdotally come up where surgeons feel pressured to comply with corporate goals rather than what they may feel is best for their patient [24]. An example might be where a young surgeon is hired by a hospital to develop a specific area of cardiothoracic surgery—aortic surgery, for example. The surgeon is well trained but may not be highly experienced. In the hypothetical case, the surgeon feels that his/her institution and its nursing or anesthetic team are not yet prepared to handle the complexities of the case without more preparation and training, yet he/she is being pressured by hospital administration to take on the case for which he/she was hired. Should he/she bow to the pressure and do the case, or should he/she transfer the patient to a different institution and risk the displeasure, and potentially adverse actions, of his/her employer.

While one may simply dismiss this as poor judgment and shortsightedness on the part of the hospital administrators, it illustrates the potential conflict between fiduciary duties to two entities. The surgeon has clear duties to his/her patient—to provide excellent care and to act in the patient's best interests. The surgeon also has duties to his/her employer. The tenets of professionalism, at least as described by Friedson, tend to put priority on duties toward the patient—at least as far as clinical performance and judgment are concerned [25]. More specifically, Friedson has pointed out that professionals must have some freedom to exercise discretionary judgment—even if it may not be in the obvious best interests of the employer. In a professional setting, as opposed to a conventional vendor/purchaser relationship, the customer is not always correct. Friedson went on to assert four other characteristics of a successful relationship between employer, client (patient), and professional: (1) adequate resources to do a job well, (2) a formal organizational structure that features some sort of "carve-out" for professionals to maintain some discretion in activities, (3) a recognition of the specialized knowledge of the professional, and (4) an element of performance measurement that is recognized within the peer professional community.

In some areas within cardiothoracic surgery: academic institutions, closed model health maintenance organizations, multispecialty clinics, and even the military as examples, the employed surgeon has long been the common model. Surgeons have learned to balance duties to two masters, yet it is not surprising that surgeons, or small groups of surgeons, who have historically been self-employed or in independent practice may struggle with the transition to one where there are clear delineations of responsibility (a hierarchical organizational structure), particularly if a physician is not at the helm.

Another area of professionalism that has come under increasing discussion lately has been the role of the surgeon in public policy and in the allocation of scarce resources. The resource in question may be organs for transplantation, money to support ventricular assist devices, or even something as commonplace as ICU bed allocation. Surgeons clearly have a duty to advocate for their patient but should society's needs at large come under consideration, and if so, how does the surgeon balance the needs of his patient with those of society, the hospital, and/or other physicians' patients? One example would be the case of a patient with severe heart failure and who may benefit from a left ventricular assist device (LVAD). While the obvious answer as to whether the individual should get an LVAD is "yes," the specific situation may be that the patient has such severe comorbidities that his/her life expectancy is extremely poor even with an LVAD. What if the individual does not have insurance that will cover the several hundred thousand dollars of anticipated expenses and the hospital organization has to cover it on a fixed budget? What other vital programs must be sacrificed for the expected, but not even guaranteed, minimal benefit of a single patient? Should the patient's surgeon be involved in these decisions? Should they be decided by a committee (potentially for diffusion of responsibility)? And can a surgeon, or any physician for that matter, compartmentalize his/her thoughts and motivations

arguing on one hand for access to an LVAD for his/her patient but against the use of high-cost technology for likely end-of-life treatments for patients in general?

End-of-Life Care

Issue of end-of-life care, are ones that essentially all cardiothoracic surgeons will deal with at some point in their careers. While discussed earlier in the context of futile care or when to say "no" to surgery, the concept of withdrawing care, and particularly terminal sedation, raises emotional levels and issues such as self-doubt and recrimination and raises concerns for lawsuits and even violence directed toward the surgeon. Fortunately, violence directed to physicians is rare in the United States, and there are generally well-recognized and accepted ways to deal with bad outcomes vis-à-vis involvement of risk management personnel within a healthcare organization. Yet the moral, emotional, and practical matters related to withdrawal of care can be challenging.

Issues that have come up through the lay press related to persistent vegetative states, prolonged coma, and even brain death, challenge the conventional notions of respect for autonomy, beneficence and non-maleficence, and even neurophysiology [26]. Is prolonging the life of someone in a persistent vegetative state beneficent or maleficent? How can one be sure of a person's wishes when they are in a coma? Could their wishes have changed? Is not instituting care morally the same as withdrawing care? And finally, in cases of terminal extubation, is the provision of narcotics hastening death or diminishing suffering? To the latter point, two theories have addressed the matter [27]. The first, the principle of double effect, postulates that the *intention* of the sedation is what is important, not the actual action. To expound, if one sedates with the goal of alleviating suffering, it is not unethical even if the outcome is death of the patient. On the other hand, if the goal is to hasten death, the action is unethical. The other theory, known as the moral equivalence hypothesis, claims that if allowing a patient to die is ethical (or unethical), then physician-assisted suicide, active euthanasia, or any other means that hastens death are morally equivalent and, hence, equally ethical (or unethical). While there are well-crafted and justified arguments for both hypotheses, from the practical and political standpoints, the concept of actively assisting death (physician-assisted suicide) has gained legal justification in only a few jurisdictions in the United States. Having said that, the risk of accepting the moral equivalence hypothesis at a policy level is that if the decision comes down that actively assisting death (physician-assisted suicide and euthanasia) is morally wrong, withdrawal and non-initiation of care, both of which are currently well accepted, would be equally unacceptable. Should this be the case, our ICUs would likely be far more crowded, and there would be many more patients being maintained on ventilators and tube feeds with a minimal quality of life. Ultimately, without significant increases in healthcare resources, our ability to care for patients with far better prognoses may be compromised.

Conclusions

- Cardiothoracic surgery shares many of the ethical challenges associated with most other branches of surgery.
- There are specific issues facing the cardiothoracic surgical community at this point in time, and it is likely that consensus will be reached on these issues and that policies may render some controversies mute, but that other ethical issues and controversies will eventually take their places.
- This chapter has attempted to describe some of the current ethical controversies facing the specialty and to offer a framework of both duty-based ethics and consequentialist ethics to help the reader analyze these controversies and come to his own conclusions regarding their resolution.

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