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The Ethics in Repeat Heart Valve Replacement Surgery

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Additional information is available at the end of the chapter

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Abstract

The treatment of patients with intravenous drug use (IVDU) has evolved to include a wide range of medications, psychiatric rehabilitation, and surgical interventions, especially for life-threatening complications such as infective endocarditis (IE). These interventions remain at the discretion of physicians, particularly surgeons, whose treatment decisions are influenced by several medical factors, unfortunately not without bias. The stigma associated with substance use disorder is prevalent, which leads to significant biases, even in the healthcare system. This bias is heightened when IVDU patients require repeat valve replacement surgeries for IE due to continued drug use. Patients who receive a valve replacement and continue to use illicit drugs intravenously often return to their medical providers, months to a few years later, with a reinfection of their bioprosthetic valve; such patients require additional surgeries which are at the center of many ethical discussions due to high mortality rates, for many complex medical and social reasons, associated with continuous chemical dependency after surgical interventions. This chapter examines the ethics of repeat heart valve replacement surgery for patients who are struggling with addiction. Considerations of justice, the fiduciary therapeutic relationship, and guiding ethical principles justify medically beneficial repeat heart valve replacement surgeries for IVDU patient populations.

Keywords: replacement valve surgery, ethics, justice, addiction, intravenous drug use

1. Introduction

The treatment of patients with intravenous drug use (IVDU) has evolved to include a wide range of medications, psychiatric rehabilitation, and surgical interventions, especially for

life-threatening complications such as infective endocarditis (IE). These interventions, however, remain at the discretion of surgeons, and the healthcare team, whose treatment decisions are influenced by several medical factors, unfortunately not without bias. The stigma associated with substance use disorder is prevalent, especially toward IVDU, which leads to significant biases, even in the healthcare system [1]. This bias is heightened when IVDU patients require multiple or repeat valve replacement surgeries for IE due to continued drug use, which can be quite costly for healthcare institutions.

We explore various barriers when considering repeat heart valve surgeries, especially the implicit bias that can negatively influence the duty of physicians and their decision to provide comprehensive patient care. Patients who receive a valve replacement and continue to use illicit drugs intravenously, often return to their medical providers months to years later with a re-infection of their prosthetic valve; many of these patients have several medical comorbidities and require extensive care. The topic of multiple or repeat heart valve surgeries are the center of many ethical discussions due to the high mortality rates associated with both the inherent mortality from ongoing drug abuse and the risks of often complex and technically challenging high-risk re-operative cardiac surgery.

This chapter examines the ethics of repeat heart valve replacement surgery for patients who are struggling with addiction, and the important factors that ought to guide health care professionals in making future treatment decisions. Considerations of justice, the fiduciary therapeutic relationship, and guiding ethical principles justify medically beneficial repeat heart valve replacement surgeries for IVDU patient populations. We will present and analyze two cases, which were presented to a hospital ethics committee, and provide justification for a narrative-based ethical approach to identify those factors for when patients ought to receive multiple heart valves and the conditions for pursuing this surgical intervention despite chemical dependency challenges.

To better examine the ethical and social issues significant to discussions about heart valve replacement surgery among IVDU populations, particularly those seeking repeat surgeries due to chemical dependency relapse, it is important to understand the current climate in the United States with respect to IVDU and IE, as well as the need for comprehensive surgical and mental health care for patients who are committed to their recovery.

2. A brief examination of the literature

There is an increasing body of literature prompted by the rapid increase of prescription and non-prescription opioid drugs in the United States that emerged in the 1990s and is at epidemic levels today. In 2016, 64,000 Americans died from drug overdoses, which was a 21% increase from the year before [2]. Some states are struggling more than others to combat this leading cause of death among Americans under age 50 [2]. Unfortunately, there is more discussion about public health and law enforcement interventions, rather than focusing on individualized medical care in persons who are in critical need of comprehensive therapy,

which includes high-risk surgeries, detoxification programs, and extensive mental health care for chemical dependency among other related mental health disorders. Helping the addict is discussed less frequently as an important step to fight this epidemic [3], which is relevant to our ethical and social examination as to why we need to re-think the standards of medical care and treat patients holistically by incorporating mental health care into every aspect of their overall care. This is especially pertinent to the treatment of IE secondary to IVDU.

2.1. Relationship of intravenous drug use and infective endocarditis

With the rise of the opioid epidemic in the past few years, high-risk valve replacement surgeries have become a growing medical, financial, and ethical burden. Historically, IVDU represented a small percentage of patients with IE. In one study, the proportion increased from 14.8% in 2002–2004 to 26% in 2012–2014 during which time, heroin use doubled [4, 5]. Today, approximately 11% of IVDU are at risk for developing IE [6], which is characterized by infection of the inner lining of the heart, leading to the growth of vegetation on heart valves that disrupt the ability to pump blood. Overall, IE is an extremely morbid disease: in-hospital mortality rates range from 11 to 26% with an estimated 5-year mortality of up to 50% [7]. Complications include heart failure, valve insufficiency, embolic strokes, and intracerebral hemorrhage. IE secondary to IVDU is most commonly caused by bacteremia from *Staphylococcus aureus* and *Enterococcus faecalis* that are abundantly found on the skin and gastrointestinal tract, or by particulates in illicit drugs that cause micro-damage to tissues as they circulate [8, 9] following injection. Treatment is often sufficient using high-dose antibiotics, but 60 to 70% of severe cases require surgical intervention [4].

Studies have shown that patients with IE secondary to IVDU are younger than patients with no IVDU and more likely to be young Caucasian males, with some regional variability among populations [4]. The average age of patients who suffer from IE secondary to IVDU is 30 years old, and 90% of them are heroin addicts [7, 8]. Approximately 75% of individuals admitted to treatment for heroin abuse or dependency reported using injection as the primary method of drug use [10].

Despite IVDU representing a significantly younger patient population with less cardiovascular and comorbid risk factors, long-term outcomes are compromised by reinfection [4] and continued drug abuse. A patient who receives a valve replacement yet continues to use intravenous drugs is likely to re-infect their bioprosthetic or homograft valves, requiring additional valve replacement surgeries. However, such treatment opportunities may not be offered to this patient population due to high mortality rates. For example, studies have found that patients who resume IVDU after their initial valve replacement have high mortality compared to patients who abstain from drug use after their surgery [11]. A patient who resumes IVDU may get an extra 1–5 years of life out of their new valve rather than the 10–15 years of life that a new valve (mechanical or biological) can give without IVDU. Such decision-making must also be done in the setting of the overall poor and limited (but somewhat incompletely defined) life-expectancy of the habitual use of IV drugs.

2.2. Factors contributing to stigma and the refusal of care

In general, many surgical professionals identify repeat valve replacement surgery as non-beneficial for patients with IVDU, and thus, refuse or are reluctant to offer this procedure or refer patients to other surgeons who are willing to treat this patient population. Even when the valve replacement surgery may provide some benefit and give a few more years of quality life for patients, surgical professionals and the healthcare team may feel as though the financial burdens to patients and healthcare institutions is a reasonable justification for not replacing infected valves. This is especially true given the high relapse rates for IVDU and readmission with active IVDU. In addition, because the IVDU patient population contributes to increased unemployment and reliance on publicly funded insurance [12], some health care professionals may feel as though they have a duty to the community by not prolonging the lives of patients with IE secondary to IVDU, and thus adding additional financial burdens for communities and an already resource-limited health system.

Smyth et al. (2010) conducted a prospective study of patients who were dependent on opioids and admitted to a residential chemical dependency service for treatment. The authors found that 91% of 109 patients interviewed had relapsed; 59% relapsed just within one week of discharge [13]. Those who had earlier relapse were characteristic of our patient population; patients are younger in age, have a history of IVDU, did not complete the recommended length of time in the addiction program, and did not enter in or commit to aftercare programs. The authors also found that delayed relapse occurred among those who completed their entire program, as well as those individuals who were in a relationship with an opiate user, which was an unexpected finding and deserves further research [13].

Furthermore, given the significant rise of IVDU with the opiate epidemic in the United States, further research on relapse is needed, including the multitude of factors that contribute to relapse. Without addressing the factors that contribute to relapse, the rate will continue to rise, perpetuate stigma, fuel healthcare professionals' reluctance to provide multiple heart valve replacement surgeries, among other medical interventions. A study in China examined heroin addiction relapse and the effects of detoxification medications (methadone) combined with psychological counseling and social support measures, which were found to be essential to ongoing recovery and reduction of relapse rates along with patient compliance [14]. Additional studies have found that patients who recur to IVDU after the initial valve replacement procedure have very high mortality compared to patients who undergo rehabilitation [15].

From a medical perspective, the relationship between IE and substance use disorder is no different than nephropathy and diabetes, coronary artery disease and smoking, or the countless other chronic medical problems that are worsened by "life-style" choices. However, the negative connotations and stigma associated with IVDU lead to patients being treated differently in the health care system and among physicians, who deny life-saving care and devalue their patients as persons in need of advocacy and support to combat their addictions.

2.3. Gaps in the literature

Unfortunately, little research has been done on the value of extensive psychiatric and behavioral health interventions prior to, during, and following surgical treatment and the overall

clinical, psychosocial, and legal outcomes (e.g., improved medical compliance, reduced recidivism in drug use and criminal acts). One study found that only 7.8% of patients treated for IE were discharged with plans to receive medication-assisted treatment during the 10-year period of the study. In that same study, 25% of patients were readmitted with active IVDU [16]. Aggressive treatment for IE, including antibiotics and valve transplants, is neither effective nor advantageous without targeting the underlying addictive behaviors that contribute to poor health outcomes and mortality.

Addiction treatment, particularly for opioid users, is limited by factors that are beyond the control of physicians and drug users who may be willing to seek recovery. A study published by Jones *et al.* in 2015 reported that nationally, 96% of states (48 out of 50) had lower opioid treatment program capacity rates than their corresponding opioid abuse or dependence rates. The study also reported that 38 states had over 75% of their opioid treatment programs operating at an 80% capacity or more [17]. These numbers are indicative of a severe national shortage in treatment options, which could in part explain the ongoing struggle in IVDU achieving or maintaining their recovery.

Furthermore, little theoretical work has been done to identify the complex ethical issues surrounding this IVDU patient population who qualify for valve replacement surgery but who may be denied this life-sustaining intervention due to a number of factors including, but not limited to, financial cost, perceived poor quality of life, suspected non-compliance in post-surgical care and addiction treatment, and social worth. This chapter aims to start closing these gaps and to provide guidance to surgeons and healthcare teams when confronted with difficult medical, social, and ethical dilemmas.

Thus, through the presentation of two cases of IE secondary to IVDU, we will identify the medical, social, and ethical issues, recommendations for whether we should provide repeat valve replacements, and how we ought to treat patients who are struggling with mental health issues, including, but not limited to chemical dependency. Our case analyses will also identify the limits of justice and the duty of health care professionals in providing repeat heart valve surgeries.

3. Case presentation

The following two case presentations are based on actual patients with identifying information removed so as to protect their identities. These cases were presented to an ethics committee for an initial recommendation; however, the analysis and discussion presented here extends beyond committee consultation or even those guiding ethical principles that contribute to decision-making and resolution. These cases reveal a need for a narrative ethical approach to best understand individual patients and their medical, psychosocial, and value-based needs from diagnosis through recovery. The cases presented in this chapter are montages of health care team members' stories about their interactions with patients through medical evidence, patient interviewing, and clinical observation. However, there is an equal need for the medical team and the patient to co-author or construct a joint narrative of illness and medical care [18, 19]. These cases, however, do represent the multiple voices of the

multidisciplinary medical team about the patient in a brief, accessible case presentation. The features of these cases serve as valuable starting points for understanding the complexity of medical decision-making, unifying repeat heart valve replacement, post-operative care, and mental health treatment, and the need for ongoing recognition of the patient's story.

3.1. Case 1: a unified care model

A 24-year-old homeless, female patient is brought into the emergency department by a family member and presents for sepsis related to IVDA. The patient has a 10-year history of drug use with previous endocarditis, requiring cardiac surgery and debridement of an infected tricuspid valve approximately 14 months prior to the current admission. She has a history of untreated depression. The patient is admitted for complaints of joint pain, swelling, and general malaise. She reports injecting heroin and crack cocaine in her extremities (feet, arms, and hands) daily. The patient was drug-free for a short period of time with the assistance of residential treatment and hospitalization at a nursing facility where she received IV antibiotics for the endocarditis. However, the patient missed a dose of Suboxone (buprenorphine and naloxone) due to lack of transportation, did not seek support from health care professionals, and was unsuccessfully attempting to stop her persistent drug use on her own. Her continued drug use and failure of medical management have resulted in the need for pre-operative cardiac surgery for large vegetation in the tricuspid valve. The patient is willing to pursue addiction treatment following surgery and post-operative care and has had a history of taking Suboxone as an effort to stay clean and sober. An ethics consult is called to provide a recommendation on whether it is ethically permissible to re-operate in this patient with infective endocarditis from persistent IVDU. The ethics committee further weighed in on recommendations for achieving a unified care model in which the immediate medical needs namely, heart valve replacement, antibiotic therapy, and acute peri-operative pain management. Critical in the discussion was also providing a pathway that includes comprehensive mental health care for the patient's depression and addiction.

3.2. Case 2: resistance to IVDU treatment

A 29-year-old married male with a history of depression, multiple suicide attempts, poly-substance intravenous drug use (heroin and methamphetamines), and a history of endocarditis was brought to the emergency department by EMS following a suspected overdose. The patient was unresponsive until EMS delivered multiple doses of naloxone in route to the emergency department. Upon arrival, the patient was alert but had difficulty speaking. The patient's wife, who is a recovering addict, alerted EMS to her husband's overdose. Upon questioning the patient's current drug use, he admits to using methamphetamine cut with Fentanyl over the past week. The patient was drug-free for approximately 1.5 months after a prior hospital admission for septic mitral valve endocarditis due to IVDA, as well as renal failure, which was resolved following treatment. He received a bioprosthetic mitral valve and antibiotic therapy. Aside from his brief period drug-free, he has never been in treatment specifically for his chemical dependency and currently feels like he doesn't need such treatment. The patient suffers from multiple cerebral septic emboli with hemorrhagic

transformation, aphasia, and distal limb emboli. He currently reports feeling feverish with body chills, headache, and joint pain; lab results show *Serratia* bacteremia, hypokalemia, transaminitis, anemia, and thrombocytopenia (I do not think we need these labs after *Serratia* bacteremia). An ethics committee is called upon to guide the treating surgeon whether this patient should receive a repeat valve replacement if he medically qualifies for this intervention. Additional ethical guidance is sought to determine what are the ethical obligations of the healthcare team when the patient does not believe he needs chemical dependency treatment and is likely to have repeated events of IE secondary to IVDU.

4. Ethics case analyses: a need for comprehensive just care and patient illness narratives

The above cases are representative of several medical, social, and ethical issues presented when patients are suffering from IE secondary to IVDU and who may require a repeat heart valve surgery and extensive mental health care for addiction and other related mental disorders (e.g., depression). In situations where patients have IE secondary to IVDU and need a new heart valve—their first surgical intervention—surgeons and others are more likely to treat the typical young patient with a probable successful surgical outcome without a need to seek ethical counsel. In our experiences, while most patients receive minimal chemical dependency treatment post-surgery, relapse (as discussed above) is likely, and a comprehensive mental health care program with monitoring, social support, and a recognition of the social determinants that contribute to the relapse are often not sufficiently addressed.

Thus, these patients return with IE and in need of a second, third, or more heart valve replacement surgeries. Surgeons and other healthcare professionals, particularly those working in community hospitals with limited financial resources, may question their duties to this patient population while considering their obligations to their medical community and society at large. Heart valve replacement surgeries, post-operative care, and addiction treatment are costly, and the financial burdens to patients, healthcare institutions, and the general community may deter surgeons from moving forward despite the patient's need. We can add the statistic about how the cost is increasing using the data from NC either here or in the paragraph with all the other statistics. Furthermore, the social stigma and biases against drug-addicted patients impact medical decisions, particularly when combined with the potential risk to health outcome measures, which can affect individual health care professional evaluations, work satisfaction, and trust among the general patient population.

The emotional impact of providing surgical care with the likelihood the patient will be back again for repeat heart valves due to IVDU can prompt moral distress, cynicism, and resentment of this patient population regardless of the moral obligations to treat when medically necessary, or beneficial. All of these considerations for repeat heart valve replacement surgeries should not be dismissed. They are essential for building a case for comprehensive just care, which is guided by core ethical principles of beneficence, non-maleficence, and justice, as well as a recognition of the individual patient's story through narrative medicine. Narrative

medicine prompts healthcare professionals to absorb, interpret, and co-author the dynamic story-telling in patient care. By co-authoring the illness narratives of patients, providers are able to acquire deeper insight into each patient's understanding of their illness, their goals for recovery, and the triggers that act as obstacles to recovery. Furthermore, through these illness narratives, providers will bear witness to the individuality of medical cases and recognize that some patients really can be helped even with the likelihood of relapse and future harm, which can reduce moral distress and clinical cynicism (e.g., "why try to help if these patients will end up abusing drugs again") [20–22]. However, the illness narratives need to be sustained; patients' stories do not end once they complete their post-operative care (e.g., antibiotic therapy).

It is our general position that repeat heart valves for patients with IE secondary to IVDU ought to be given if they are medically beneficial and if the patient is willing to commit to addiction recovery and ongoing, comprehensive mental health treatment that aims to address the social triggers, existing mental health disorders, and other factors that influence the chemical dependency. This is not the responsibility of the surgeon alone, but a medical team that has access to hospital and community resources, appropriate skills, knowledge to address the whole patient and their medical and psychosocial needs, and the ability to combat social stigma by treating the patient as a person with a very specific narrative. When repeat heart valves are not medically necessary or ethically beneficial, may cause undue suffering, and/or the patient is unwilling to commit to a comprehensive treatment program after thorough guidance by the health care team, then it is ethically justifiable to refuse surgery. However, each case is unique, and there may arise unique considerations that have not yet been previously addressed or ethically analyzed. Thus, it is essential that a narrative ethical approach that calls attention to the nuances of the case, i.e., the elements of the patient's story, is automatically part of the medical assessment and a sustainable chronic care plan.

4.1. Case I analysis: establishing standards of care

In this first case, there are a number of social factors that are contributing to the patient's current medical state. First, this is a young, homeless patient who does not have the means to acquire sustainable basic human needs. Regardless of whether her drug use led to the homelessness or vice versa, she is surviving in an unhealthy, unsupportive, and harmful environment, which is an obstacle to addiction recovery and overall health. When living in a residential treatment facility, she was able to have security, shelter, food, warmth, and community support, in addition to, medical treatment, all of which are essential for a recovering addict who, unfortunately, did not have these resources prior to her first valve surgery. However, these resources are limited; they are only available for the duration of her medical treatment for the endocarditis, and not for the ongoing recovery for her addiction. Her lack of essential resources, social instability, and homelessness are likely to have played a role in her subsequent relapse while on Suboxone; this demonstrates the necessity for holistic and comprehensive care in order to fully rehabilitate a patient with a chronic condition. Furthermore, this patient has a history of untreated depression—another significant factor that could have led to her current medical state.

The use of IV drugs to combat feelings of depression and despair are not uncommon among untreated patients. Reasons for why she did not seek medical attention for her depression are unknown, but given the difficulties of navigating the health care system, federal insurance programs, and community programs that can aid a patient in accessing mental health care, it is not surprising that her depression went untreated. A person already addicted to IV drugs may have even more difficulty accessing mental health care due to the cognitive effects of the drugs, the stigma of drug use, and the lack of social support in seeking help. This patient tried to stop her drug use, but could not stop without the necessary social support and addiction therapy. Because she was previously successful at recovery, is a good surgical candidate for a medically indicated tricuspid valve replacement, and has a strong commitment to seeking post-operative care and addiction treatment, the surgical intervention should be granted. An ethics committee convened with this case and further recommended that it is critical for a team-based approach to be utilized for patients with IVDU who are seeking valve replacements.

A range of medical specialists and addiction experts, along with the surgical team, are essential for developing and implementing a treatment plan. It is also recommended that these patients sign a behavioral agreement in addition to the standard surgical consent form that details the patient's level of understanding about the risks and benefits of the surgery, addiction interventions, and any other medical and psychosocial care that promotes a good clinical outcome. Clinical outcomes are often determined by the success of the surgeries and post-operative care. However, we need to begin to look more critically at the long-term success of recovery, factors contributing to relapse, and how a team-based approach can aid the patient in quickly getting back into recovery. Recovery is a life-long process and a good clinical outcome may take years to fully measure and understand despite the more immediate surgical successes.

In the end, this patient did receive re-operative tricuspid and aortic tissue valve replacement. However, the behavioral contract, a non-legally binding contract, was not used. This contract prompts the patient to understand the need to get comprehensive treatment beyond a valve replacement, as well as empower the patient to take charge of her life, and maintain physical and mental health through ongoing counseling, therapy, and pharmaceutical interventions to treat her depression and addiction. The value of the contract is that it is a way to understand the patient's illness narrative and her commitment to recovery; although not used for this particular patient, it is a useful tool that can be beneficial for other patients. Of course, basic human needs (home, food, social support) are also needed, yet securing these resources for patients can be a challenge without having social work, nursing, and community support. There are limitations to what a surgeon can do beyond immediate surgical care, so it is critical for a wider health care community to recognize their ethical obligations to this patient population.

4.2. Case 2 analysis: a deeper understanding of medical need

In regard to the second case, this young male patient is struggling with mental health issues—particularly untreated depression and addiction—and is married to a recovering addict, who either can be a positive or negative influence in his recovery depending on their willingness

to work together toward mutual recovery. Without mental health treatment, his depression, suicidal ideations, and addiction will continue. One of the primary problems with this case is the patient's reluctance (which might be confounded by potential neurologic dysfunction due to his embolic strokes) to mental health treatment, feeling as though he does not need it despite the magnitude of health complications arising from his pervasive drug use. Specifically, the IVDU has led to multiple hospitalizations, a mitral valve replacement, and multiple, serious co-morbidities that have left him with ongoing physical pain and cognitive impairment. Prior to testing for valve functionality, this patient, too, was presented to an ethics committee, which prompted discussion regarding whether valve re-operation would be beneficial to this patient with serious comorbidities that may increase his surgical risk and lead to a poorer quality of life.

Similar to the first case, discussions surrounding addiction stigma, the need for social support, a need for the patient's commitment to seek addiction treatment, and a team-based approach to patient care were presented. However, unlike the first case, this particular patient is suffering from a number of medical issues that each need to be taken into consideration in the evaluation for a replacement valve, as well as an acknowledgment of the patient's lack of commitment to comprehensive mental health treatment. The ethical guidance sought is grounded in the principles of beneficence and non-maleficence, as well as a narrative-based justice approach that details the specifics of the patient's medical history, social support, quality of life, and his preferences and commitment to recovery. The goals of the medical team, from an ethical perspective, are to very carefully look at his medical condition, and whether he even has a chance for survival and future quality of life with a second valve replacement surgery. Second, it is critical for the medical team to revisit the topic of comprehensive mental health care, including treatment for depression and chemical dependency. Objective consideration must also be given if there are overwhelming evidence of medical/surgical futility—but this concept can be extremely difficult to determine in young patients.

The need for aggressive inpatient chemical dependency treatment is essential to this patient's recovery. However, unlike the first case in which valve replacement surgery and addiction treatment are simultaneously discussed as a holistic approach to patient care, for this patient, the addiction treatment becomes an interesting topic of discussion due to the gravity of his medical condition and his resistance to treatment. That is, the first case had less medical ambiguities in terms of the surgical candidacy for valve replacement combined with a clear indication of the patient's commitment to recovery. Thus, due to the immediate and justifiable medical need, the decision to move forward with surgery came simultaneously with a team-based plan and patient contract for recovery. Here, the patient's condition warrants an initial discussion about whether replacement valve surgery would be non-beneficial treatment. Causing further harm either during surgery or postoperatively should be avoided so as to ensure the best quality of life while living with a terminal condition. Furthermore, if the replacement valve surgery would be deemed beneficial, there remains the issue of the patient's lack of commitment to recovery. If there is persistent resistance to mental health care, ethically it would be unjust to proceed with a surgical intervention.

Following the ethics consult, the patient's valves with small vegetation were functioning, and his bacteremia was responding well to antibiotic therapy. The surgical team determined that after

he completed extended care, he then should seek aggressive inpatient chemical dependency treatment to limit the risk of relapse and recurrence. However, the medical team may be at an impasse given the patient's current resistance and lack of commitment to addiction recovery.

While it is recommended the medical team should have ongoing dialog with the patient to understand his reluctance at undergoing mental health treatment, and continuing to identify providers, care facilities, etc., that could aid in his recovery, additional steps may be needed before proceeding with any future medical interventions (e.g., valve replacement). If medical therapy alone fails e.g. progression of disease, worsening valve functioning, or recurrent emboli that lead to further complications, treatment options will need to be re-evaluated. Depending on his medical state, the patient may not be a future candidate for a replacement valve, and thus other medical resources and personnel, such as palliative care, may be required for the care of this patient.

In our first case, it is recommended the patient sign a behavioral contract to strengthen her existing commitment toward recovery, which further illustrates she does not have to go through recovery alone, i.e., the medical team will not give up on her if she maintains her commitment. In this second case, however, a behavioral contract may not be enough, since such non-legally binding contracts are symbolic gestures of the medical team's medical/social/legal relationship to a patient the shared responsibilities of both parties. When a patient is not willing to share responsibilities in the relationship and is resistant to addressing serious mental health disorders, the first step is to understand why.

4.3. Addressing the ethical and social problems of repeat valve replacements and the limits of justice

Valve replacements in IVDU must be administered regardless of the negative connotations associated with addiction or illicit drug use, with the patient's health, surgical success, and access to comprehensive addiction treatment being the goals of treatment. Both conscious and unconscious biases can affect clinical judgments that lead to unjust decision-making and disrespectful treatment of patients.

Similar to the health disparities we see in organ transplantation cases, where racial and ethnic biases have affected the length of time on a transplant waiting list, or lifestyle behaviors (e.g., alcohol addiction) have affected judgments about probability of success for organ replacement surgeries, medical judgments are not immune to bias when determinations about medical outcomes are being made. That is, it is all too easy for a surgeon to determine that her patient does not qualify for a valve replacement because of the high surgical risk, which may be based on the patient's untreated addiction, probability of relapse, and co-morbidities due to the effects of IVDU (e.g. the inherent risks of recurrent overdoses), rather than on the patient's survivability on the surgical table and success of the valve replacement itself. A surgeon may also exhibit conscious biases toward her patient when considering the continued burden of having to provide ongoing treatment, which increases the financial and personnel cost to the medical institution. Thus, such attitudes and feelings lead to a biased clinical judgment, but may also be generated out of concern for professional evaluation and outcomes-based, performance measures.

The first step in reducing the need for repeat valve replacement and improving patient health outcomes and survivability is to understand the patient's own unique story that prompted the IVDU, their goals for treatment, and their overall understanding of their own responsibilities toward successful, comprehensive treatment. By motivating them with a behavioral contract that speaks to the healthcare team's responsibility to the patient's care and the patient's own commitment, this may be a positive step.

Second, patients will not have a chance for successful recovery if they are not provided with needed resources and appropriate guidance to motivate them to seek long-term treatment. Such treatment should involve methods ranging from psychotherapy to pharmaceutical interventions.

Unfortunately, most current care is focused on the infective pathology; in IE patients only the acute problem is addressed, but no effort seems to be placed on preventing readmissions or improving the patient's quality of life. Addressing the lack of care and support IVDU patients are receiving, rather than trying to limit patient access to replacement procedures provides the just treatment these patients deserve, in addition to reducing the financial burden on healthcare systems and society. Health care providers often fail to identify addiction as the significant comorbidity that it is, and do not treat it as aggressively and appropriately using drugs that specifically target opioid use disorders; this results in under-treatment of addiction [16]. Such a limited care approach needs to change.

Third, surgeons and the healthcare team also require the support of ethics teams when complex social and ethical questions arise with patients. Personal biases lead to social stigmatization of patients with IVDU, influence medical decisions, lead to provider burnout, moral distress, and cynicism among health care providers. Having ongoing team-based discussions about these negative experiences, attitudes, and emotions is one step in the right direction. Recognizing the ethical and social issues that penetrate the medical problems can also help navigate and resolve dilemmas and elicit a deeper understanding of the individual patient and their illness narrative. It is important for healthcare providers to engage in self-care, and to have the opportunity to address issues before they devolve into negative emotions and attitudes that can be harmful to self and other.

Finally, it is critical for the health care team to know when additional treatment is futile. There are limits to justice. However, such limits to therapies must be based upon objective evidence supported by the medical literature rather than poorly grounded assumptions, biases, and outdated, or erroneous knowledge or datasets.

5. Conclusions

Unless physicians treat the chronic and acute illnesses in patients with IE due to IVDU, their ethical duties toward their patients remain unfulfilled, and they fail to provide just care. This issue becomes more precarious when considering patients who require additional valve replacements due to continued IVDU.

The American Medical Association's *Code of Medical Ethics* states that is the physician's ethical obligation "to place patients' welfare above their own self-interest and above obligations to other groups and to advocate for their patients' welfare" [23]. It is the duty of physicians to promote the health of their patients through comprehensive, beneficial treatment based on evidence-based medicine, and to respect them as persons with dignity, uninfluenced by social stigma and clinical bias. For patients with IE secondary to IVDU, it is important to treat both the psychiatric, social and infectious etiologies: the substance use disorder, homelessness, and food insecurity, as well as the IE, along with any additional comorbidities that are present. Although every patient with IE secondary to IVDU differs in the severity of presentation and comorbid conditions, patients with a positive prognosis should have the opportunity to achieve health and life with medical assistance.

Unfortunately, it is not unusual for patients with recurrent IE secondary to IVDU to experience social stigmatization and bias at the hands of the healthcare system and to be denied the comprehensive care that is needed in such cases. While some patients are justifiably denied due to a significant medical risk over benefit, patients are also denied simply because they are perceived as non-compliant, or because their potentially risky surgical treatments may negatively affect the health reviews and ratings of the surgeons performing the valve replacements. It is not ethically just to penalize viable surgical candidates when their addiction has neither been addressed nor treated. Citing high rates of treatment failure and non-compliance is not a valid excuse when the substance use disorder has not been treated as aggressively as the IE, especially when taking into considerations the lack of resources available for these patients to seek and maintain recovery.

Conflict of interest

The authors have no conflict of interest.

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