

Sternum – A cadaveric bone of contention in heart transplant

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Abstract

A quarter of all deaths in the UK are estimated to be caused by heart disease. Currently, the most effective solution to save patients with end-stage heart disease is a heart transplant. Due to the shortage of donors, many patients continue to remain on the waiting list, but not all are fortunate to receive a heart in time and are overcome by death. From an Islamic perspective, one reason that Muslims could be reluctant to sign up as heart donors appears to be based on an interpretation of the hadith that prohibits breaking any bone of the deceased. We argue, based on a contextualised examination of this hadith that the prohibition does not apply to heart transplants because of the way transplants are performed and regulated in the UK in our time. We also argue that during heart retrieval, ‘dividing’ the sternum is the more appropriate clinical verb to describe sternotomy rather than using the deleterious verb ‘breaking’ which has negative connotations. Our article aims to help British Muslims who are considering becoming heart donors - to potentially save lives - to make an informed decision from an Islamic perspective.

Introduction

Heart damage can occur in any individual for several reasons. Heart failure could be caused by underlying health conditions or in some cases by genetic factors. In the UK, as of Jan2022, the number of people living with heart or circulatory (cardiovascular) diseases was estimated at 7.6 million [1]. This number is twice as many as the number of people living with cancer and Alzheimer’s disease combined. Consequently, approximately more than 160,000 of all deaths each year in the UK are caused by cardiovascular diseases. This is approximately a quarter of all deaths each year [1].

The most common causes of heart failure include myocardial infarction (heart attack) and high blood pressure [2]. Another common cause is cardiomyopathy (a disease of the heart muscle), which might be inherited or caused by, for instance, a viral infection such as rubella. Heart failure can also result from abnormal heart valves, congenital heart disease, and infection (endocarditis). Despite current improvements in the treatment of cardiovascular diseases, according to the NHSBT annual report on cardiothoracic organ transplantation:

The number of patients waiting for a heart transplant has increased substantially over the past decade, from 130 in

2011 to a peak of 340 in 2020, representing a 162% increase over the 10 years [3].

The BHF also highlighted that at the end of January 2022, the number of people on the cardiac waiting list had grown to 293,500 people; nearly 2,700 more than the previous month [4].

To manage a failing heart, medicines and different forms of treatment can help. However, when the ability of the heart to function deteriorates severely, the only remaining option in a select number of patients is a heart transplant. Even in a heart transplant, there is a range of options to consider including a human heart, a porcine heart, and even an artificial heart. Xenotransplantation is when an organ is retrieved from one species and transplanted into another - as in the case of transplanting a porcine heart into the human body (xenograft) - there are, however, two major obstacles. Firstly, the human immune system is very likely to reject the animal tissue, Secondly, there is a potential risk of animal disease passing onto the recipient. As such, and as it stands, there appears to be more harm than benefit with regard to xenotransplantation. This opinion, however, could be reviewed based on future developments in this regard [5].

Whilst patients wait for a suitable donor heart, among the challenges that physicians face with regard to treating the heart is to prevent their patients' hearts from further deterioration. In most cases, the deterioration leads to significant breathlessness and simple acts of daily living, such as washing, dressing, or leaving the house become exceedingly difficult. The practical and optimal treatment option for such patients would be a suitable donor heart. However, to help them survive until a suitable donor heart becomes available, artificial devices to support the heart can be used. These devices can be implanted or inserted to support the failing side of the heart. A left ventricular assist device (LVAD) or a right ventricular assist device (RVAD) are used, which could allow such patients more time [6]. LVADs are battery-powered artificial heart pumps that require recharging every 4-6 hours.

LVADs, however, are scarce, and every year, approximately only 80 patients are given an LVAD [6]. Even though LVADs can be lifesaving, as of June 2022, no more than approximately 100 patients in the UK currently live with an LVAD. The BHF states that:

The longest that we've supported a patient for with an LVAD has been five and a half years. Nowadays, 80–85

per cent of patients are alive a year after having an LVAD fitted and 70–75 per cent after two years.

Whilst LVADs could be improved in the future and might even replace heart transplants, currently, LVADs serve only to buy more time for patients until a suitable donor heart is found. Bearing this temporary solution in mind, Anthony Clarkson, Director of Organ Donation and Transplantation at NHS Blood and Transplant, states, 'We can save more lives if more organs are donated, and we urgently need more hearts to help the hundreds of people waiting for a transplant' [7].

For a heart transplant, physicians must consider several key factors in relation to the donor. These include ensuring that consent has been obtained to retrieve the donor's heart, that the donor heart is healthy for transplantation, and that the donor has indeed died. Even after an individual consents to heart donation, the heart would only be retrieved only if it is suitable to transplant. As such, there could be medical reasons for why a heart donation would not proceed despite an individual having consented to be a donor.

In our discussion on this issue, we focus on the socio-theological reasons why a heart donation might not proceed. One of the key arguments put forward against organ donation by the former grand mufti of Pakistan Mufti Shafi [8] revolves around human dignity. In this context, we find that according to Muslim jurists, the overarching goal of Islamic law is to preserve the honour and dignity of the deceased. Muslim jurists agree on several different actions that are considered dishonourable. Fadlullah [9] lists some factors for Muslims to consider in relation to cadaver donation. Below, we discuss four major factors related to honour and dignity.

1. *Preservation of life*: To take one's own life is strictly prohibited. However, fighting for one's rights, people, or resources also brings risk to one's life. Should one die for such a cause then such an act is not viewed as suicidal by society but honourable [10]. In the case of self-defence, the intention is to ward off the antagonist and not die. Accordingly, Shariah law permits and makes exceptions to general rules when the outcome is to save a life. However, a life that is not a threat to the living cannot be taken to save another life.
2. *Human organs are not for sale*: Selling human body parts is viewed by Muslim jurists as dishonouring the human body. As such, selling kidneys, for instance, is universally prohibited by Muslim jurists.

3. *Consent*: Operating on the body of another human being without consent is not permitted [11]. According to Shariah law, a surgeon is not permitted to cut deeply or even inject another human for treatment without prior informed consent from the patient.
4. *Funerary rites*: When a human dies, a proper and timely funeral must be provided. If the deceased identified themselves as a Muslim, then the deceased must be offered the Islamic funerary rites. Accordingly, Muslims are instructed to carry out a ritual wash and provide a shroud for all deceased persons and bury them without any unnecessary delay.

British Muftis are advised to consider heart donations within the British context given the rules and regulations enforced by the NHS and the Human Tissue Authority (HTA). In the UK, the sale of a heart is prohibited and would be highly unlikely because transplants are not based on such financial agreements, rather the transplantation process is regulated by the NHS and the HTA. The transplantation process in the UK is principally based on an algorithm designed to match a suitable heart recipient [12]. The identity of the heart donor is kept anonymous and the heart transplant process does not include any mutual agreements between the donor and recipient.

Consent

In the UK, a heart donation cannot proceed without consent. Consent can be given either by opting to be a donor or for those in England and Wales, by not opting out of the law of deemed consent. Moreover, the law of deemed consent in England and Wales is a soft opt-out system. This process means that despite an individual not having opted out from donating, the final decision rests with the deceased's family. Bearing the patient's consent in mind, Sachedina [13] highlights that 'more pertinently, desecration carried out in aggression is certainly different to a clinical incision made with the deceased's permission left in the advance directive to retrieve an organ'. As such, there appears to be no violation of human dignity on the part of the donor or the transplant team.

Funerary rites

Under ordinary circumstances, the corpse of a person who identified as a Muslim is to be given a set of funerary rites without any unnecessary delay. These rites include a bath, a shroud (also known as a *kafan*), a

funerary prayer, and a burial. These rites are considered to be important as they are an expression of honouring deceased Muslims. As a result of the heart retrieval process, the burial is delayed, which is viewed by some Muslims as a violation of human dignity [14].

However, it is common practice that organ retrieval is carried out as soon as brain death is confirmed, thus the burden of delaying the burial can be negligible and arguable.

Issues related to medical necessities

For a medical need, and in the case that a treatment option falls within the realm of a defined prohibition, one of the Islamic maxims that can be applied is that of the permission of choosing the 'the lesser of two evils' [15]. Other maxims that can be applied include: 'necessity permits the prohibited', 'hardship facilitates ease', and 'needs (haja) share the same legal ruling of necessity' [16]. However, the mere existence of a permissible alternative is insufficient to disregard what would otherwise be a prohibited option. Rather, the permissible alternative should be equally effective as the one that is considered to be prohibited for the alternative to gain preference.

Furthermore, an important ethical maxim states that 'The sanctity of a living person is greater than that of the deceased' [17]. This means that the interest of the living takes precedence over the interest of the dead. Donation from a deceased person would have no implications to their life – which has ended – as opposed to the living donating their organs. Also, donations from the deceased would provide organs that cannot be obtained from living human donors, such as the heart and the lungs. Moreover, a single healthy cadaver can provide several organs that could be transplanted to benefit different patients and save their lives. As such, a heart donation would not only help patients with a failing heart to survive but would also help to alleviate their daily suffering.

In relation to medical necessity, a number of factors are considered by Muslim jurists such as:

- 1) *What Islamic values would be violated?*
- 2) *Why are these violations necessary?*
- 3) *Is there an alternative?*
- 4) *Who would be harmed if the concession is not made?*
- 5) *Who benefits if the violation is tolerated?*

Violations of Islamic values during heart retrieval

To retrieve the heart, a 24-30-inch vertical incision is required along the abdomen and the chest followed by sternotomy – which is the splitting of the sternum using a highly designed medical saw with minimal force. The sternum, which is to be split, has been viewed as a ‘bone of contention’ among Muslim jurists because sternotomy appears to conflict with Islamic values, which demand that the deceased be treated with dignity. The objection against sternotomy is based on a hadith, meaning a saying of Muhammad, the Prophet of Islam (peace be upon him, here forth referred to by his honourification *Rasulullah*) that ‘to break the bone of the deceased is equal to breaking the bone of the living’ [18]. Here forth, we will refer to this hadith as *hadith kasradhm al-mayyyit*.

In terms of dignity, this hadith can be understood to mean that a corpse should be left intact during the funerary process, the burial, and arguably after the burial [19][20]. This dignity even extends to events that require the exhumation or relocation of the buried corpse. Consequently, splitting the sternum of a deceased donor, raises ethical issues resulting in conflicting views. Scholars including Shafi [8], Sunbhuli [21], Abu Zaid [16], Qabbani [22], Bakru [23], and Ghumari [24] view retrieving organs from a cadaver as strictly forbidden due to the violation of human dignity. These scholars argue that based on Ibn Hajar’s interpretation of the hadith, the dignity of the deceased remains of equal importance as when one is alive [25]. Bearing this in mind, Ebrahim [26] highlights the sentiments of those reluctant to permit cadaver donation by echoing the question, ‘How can one be permitted to cut up a man’s body and remove an organ from it?’

The necessity of the violation

By contrast, other Muslim jurists view cadaver heart donation as being permitted due to dire necessity, lack of alternatives, and based on the notion that donating upon death is considered honourable [27][28]. This group of Muslim jurists hold the view that the above-mentioned factors override the theological argument given by jurists who oppose organ donation. As heart retrieval cannot be done without sternotomy, the necessity to have the heart retrieved can arguably be given greater importance.

Alternative treatment

A human heart is the most effective replacement for an irreparably damaged human heart. Furthermore, as of 2022, there are no alternatives that equal heart donations in effectiveness. In essence, by tolerating the splitting of

a donor’s sternum, life could be saved. Alternatively, by prohibiting heart donations - from consenting donors - based on the notion that the sternum of a deceased donor must not be split, the life expectancy of those who require a heart transplant is adversely impacted.

Beneficiaries of heart donation

From a non-theological viewpoint, arguments are made both in favour of and against cadaver organ donation. If one’s existence ceases with death, then donating a heart neither benefits nor harms the deceased. Even if the recipient is grateful, the gratitude is received by the family of the donor. On the other hand, from an Islamic viewpoint, death is not the end. *Rasulullah* taught Muslims that *sadaqa* (charitable actions) continue to benefit a person even beyond death [29].

Dividing the sternum

Antagonists of sternotomy and heart transplants present *Hadith kasradhm al-mayyyit* as conclusive evidence to prohibit cadaver donation. The argument follows that sternotomy is forbidden and, as such, heart retrieval is also forbidden. However, Sheikh Abdul Majeed Saleem (The Grand Mufti of Azhar 1950-52) argued that the hadith defines a ruling that is bound to the context in which it was created [30]. A closer reading of the hadith suggests that the deceased should be treated in a manner similar to the living. In essence, it is not the act of ‘breaking’ that is forbidden, but it is the premise that the human body deserves the same honour and dignity in life and in death. There is clear implication in the hadith that breaking the bones of the deceased is ‘forbidden’ in the same way it is ‘forbidden’ to break the bones of a living person.

In the foregoing discussion, the verb ‘splitting’ and ‘breaking’ have been used to describe sternotomy. These verbs negatively connote excessive force and damage. However, from a surgical perspective, the term ‘division’ is more appropriate. A heart retrieval follows standard surgical procedure and as such, the sternotomy is performed by a trained surgeon using highly efficient medical equipment. A precise cut to the bone is possible with minimal risk of damage to other tissues. The sternum is, therefore, arguably ‘cleanly divided’ in a straight line in the middle and not ‘broken’. The heart is transplanted through a similar precise sternotomy. This division is then wired back together once the heart is retrieved. The procedure is identical to other forms of open-heart surgeries in a living patient. Bearing this in mind, if the sternum of a living person could be divided

for life-saving purposes then on that basis, why would dividing the bones of the dead be prohibited for the same reason?

Legitimately arguable then is the idea that if the bones of a living person can be surgically operated on for medical reasons, the bones of the deceased could also be surgically operated on for acceptable medical reasons. When a patient consents to have particular bones divided for a medical need, Islamic law permits such procedures. In most cases, this would be by explicit verbal or written consent. Examples include orthopaedic procedures, craniotomy, amputations, separation of conjoined twins, bone marrow transplants etc. However, there can be situations when explicit consent might not be possible, but rather consent is assumed or granted - such as in a case when a patient is rendered unconscious due to a serious head injury, or in the case of cardiopulmonary resuscitation (CPR) where potentially a rib could be fractured. As such, the act of 'fracturing' the bone of the deceased itself is not the primary issue but rather determining the 'necessity' of the possible fracturing. Just as it is permitted to divide particular bones of a living patient for a medical necessity, the hadith could arguably be understood to endorse the same for the bones of a dead person.

Is donating a heart honourable?

Sternotomy is performed only after consent is obtained by or on behalf of the donor. According to Al-Qaradaghi [31], the consent of the donor eliminates the violation argument and makes the surgical procedure permissible. A possible tentative argument as to why organ harvesting from the deceased is not tolerated in Islamic law is the potential delay in performing the funerary rites. This delay can be argued as 'dishonouring' the rights of the deceased. With this notion in mind, all efforts need to be made to ensure that funerary rites including a timely burial are offered. In terms of honouring the deceased, a heart donation does not prevent or significantly delay the donor from any of their Islamically afforded funerary rites.

Furthermore, a counter-argument for permitting sternotomy for a heart donation is that just as funerary rites bring honour to the deceased, so does saving the life of another human being. The Qur'an states that 'whoever saves a life, it is equal to saving all of humanity' [32].

Sheikh Ibrahim Al-Ya'qubi [33] described organ donation as being honourable for the deceased in the sense that the organs continue to remain beneficial for the

living. Egyptian scholar Muhammad Abu Shadi described organ donation as a noble act in the same way that sacrificing one's life for a just war is considered noble [34]. In relation to corneal transplants, Badawi [35] remarked that 'the success of recovering vision for a human is a wonderful gift and is demanded by the Sharia'. Mufti Kawthari (2004) adds that:-

Current procedure of organ transplantation is not considered dishonouring a human body. The surgery is performed in the most respectable way and it is not considered to be disrespectful. This is the reason why many highly respected people of the community regard donating of organs as a mark of merit, and they are not looked down upon [36].

Ibn Abd Al-Barr (d.1071) argued that the *hadith kasradhm al-mayyyit* applies to a specific context. He further argued that by consensus of all Muslim Jurists, legal financial compensation applies only when someone breaks the bone of the living [37]. The application of such ruling implies that the similarity between breaking the bones of the deceased and that of the living is in terms of honour and dignity. Saleem [30] comments that the hadith could not have in any way taken into account organ transplantation due to the simple fact that it did not exist at the time. On this note, Yaseen [38] asks that since current transplantation practice was not considered at all in early Islam, what were their concepts of benefits, if any, from the transfer of a kidney, an eye, spinal marrow, a bone, the skin or any other human part? Certainly, not in the way we view reasons for extracting organs in the 21st century.

In light of the fact that organ transplantation was not possible, Al-Mawwaq (d. 1491) [39] from the Maliki school of law commented that the hadith prohibits abusing a dead body. Accordingly, Moroccan scholar, Mustapha Ben Hamza argued that the hadith prohibits exhuming graves in order to plunder them and such practices cannot be equated with transplantation, which is life-saving [40]. Sheikh Al-Qaradhwawi also reiterates that the hadith refers to the mutilation practised in battles - such as those committed at the battle of Uhud, when the Meccans mutilated the deceased soldiers of the Muslims [41].

In relation to retrieving the cornea from a deceased donor, Al-Haridi [42] stated that the wider meaning of the hadith is to honour the deceased and not tamper with dead bodies unnecessarily (see also Bakru [43]). Saqar [44] also argued that there is a greater good in transplantation and is the lesser of two evils.

Conclusion

Having analysed hadith *kasradhm al-mayyit* and the manner in which Muslim jurists interpreted the hadith in a number of scenarios, a few points can be concluded. Firstly, manipulating the bones of the living for medical reasons, after gaining consent by the patient, is permitted. The central argument in all cases is principally necessity, avoiding harm, and lack of alternatives. The underlying principle for *hadith kasradhm al-mayyit* appears to be the prohibition of breaking bones unnecessarily, whether that be of the living or the deceased.

Although no precedent in classical Islamic jurisprudence resembles heart donation, the discussions around human dignity, consent, tolerance, and charitable deeds allow a framework within which to situate heart donations. According to the Qur'an, saving the life of another human being is among the most honourable actions and saving one life is considered to be equal to saving all of humanity. As of 2022, the best alternative for a critically failing human heart is a human heart.

Heart donation is a novel case compared to the cases discussed in classical Islamic jurisprudence. In practice, for a heart donation, the donor gives consent prior to death; with the intention to save the life of another human being - as well as to hope to benefit in the afterlife through this act of sadaqa. Muslim jurists and health professionals could promote heart donations better by highlighting the fact that the heart transplant procedure differs in context to that of hadith *kasradhm al-mayyit*, which seems to have played an unnecessarily significant role in discouraging heart donation. Furthermore, the anxieties of British Muslims can be addressed by highlighting that consent is mandatory. Furthermore, organs are strictly monitored by the Human Tissue Authority (HTA) to ensure that organs and tissues are not subject to any commercial transactions. Moreover, a heart donor can be honoured not only by the customary funerary rites but also by the exclusive honour of being a life-saving donor.

This article focused on the issue of sternotomy to retrieve the heart. However, there exist other concerns in relation to heart donation such as ensuring the donor has died of brain death. In this regard, concerns related to brainstem death are not discussed in this paper. Further ethnographic research could be conducted at the grassroots level in the UK by social scientists in collaboration with British Muslim jurists with regard to the perception of heart donors by the British Muslim community.

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