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The human being was created like this: They took the wings of an angel, and tied them to the tail of a donkey, in hopes that the donkey—from the radiance and companionship of the angel—might become an angel, too. So what is so wonderful if this donkey became a human? God is able to do all things [1].

Introduction

In Islamic theological anthropology, humans are tied in a nexus of relationships—underneath but connected to God who is at the highest node, linked to human beings on an equal footing, and connected to animals who are the lower node in service to humankind. Humans are a constituent of two opposing forces: The spirit of God and dark mud. It is mentioned in the Qur’an that God created the first human Adam from dried clay formed from dark mud and then breathed His Spirit into him [2].¹ It is the

¹All Qur’an translations are from ‘The Qur’an. Abdel Haleem, M.A.S. Oxford: Oxford University Press; 2010.’

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combination of the spiritual and the profane that makes human a paradoxical creature eloquently captured by Rumi in the epigraph above. Depending on their behaviour and conduct, humans have the potential to soar to the heights of the angels or alternatively fall to the depths of depraved creations even below animals. These fallen ones are branded in the Qur'an as spiritually unhearing, unseeing, and unseeing and are likened to animals and at times worse than animals.

We have created many jinn and people who are destined for Hell, with hearts they do not use for comprehension, eyes they do not use for sight, ears they do not use for hearing. They are like cattle, no, even further astray: these are the ones who are entirely heedless [3].

As a recipient of God's Spirit, the human is privileged with the title 'vicegerent' (caliph or *khalīfa* in Arabic). As God's vicegerent, the human is the 'instrument through which God's will is realized and crystalised in this world' [4] (p. 29). Consequently, for human comfort, as well for the purpose of bolstering their capacity to do good works, God has placed the entire creation at his service. But the caliphate is tempered with a reminder that the caliph in return is only a servant of God (known in Arabic as *'abd*). This bridles the caliph-cum-servant from exercising unfettered discretion over the creation. Thus, all those who wastefully squander God-given resources are termed the brothers of Satan in the Qur'an [5].

From a theological lens, animals have been created to benefit humanity. In the language of the Qur'an, this is known as *taskhīr* (subservience). All of nature is *musakkhar* (subservient) to the human who is the most privileged of creations. Thus, God permits humankind to hunt certain animals [6] and consume their flesh and milk (and honey) [7], to ride them [8], and to deploy them in service to benefit from their labour or products, such as wool [9]. Despite this servile status, humans are reminded that the primary obedience of animals lies with God; and there are many instances recounted in the Qur'an where animals have been employed by God to keep humans on the straight and narrow.

A crow taught the son of Adam, Cain, funerary rites [10]. Animals have been instrumental in implementing God's punishment [11] and cruelty to animals has triggered God's wrath [12] (See [13] for more examples). The Prophet reprimanded against purposeless killing of animals. He said, '*Whoever kills even a sparrow or anything smaller, without it deserving it, God will question him about it*' [14]. The Prophet extolled compassion towards animals. He exhorted, 'The Compassionate One has mercy on those who are merciful. If you show mercy to those who are on earth, He who is in the heaven will show mercy on you' [15]. During the slaughter of animals, he commanded that the knife be sharp and the cut swift to cause minimal pain. He forbade slaughtering one animal in front of another. Thus, he said,

God has prescribed proficiency in all things. Thus, if you kill, kill well; and if you slaughter, perform it well. Let each of you sharpen his blade and let him spare the suffering of the animal he slays [16].

Illustrating the compassionate treatment of animals, the Prophet Muhammad recounted the story of a prostitute who went down into a well and filled her leather

sock to quench the thirst of a dying dog. God forgave her for this act of benevolence [17]. In contrast, he shared an incident about another woman who locked a cat in the house and starved it to death. That woman was decreed as hell-bound for her cruel behaviour [18].

This ethos of treatment of animals with care, compassion and God-consciousness (*taqwā*) is captured in the hortatory Prophetic counsel where he encouraged Muslims to recite a prayer from the Qur'an every time they mount a beast; to remind them that it is God who has subjugated (*taskhīr*) such magnificent animals for human ease.

[It is God] who gave you ships and animals to ride on so that you may remember your Lord's grace when you are seated on them and say, 'Glory be to Him who has given us control over this; we could not have done it by ourselves. Truly it is to our Lord that we are returning,' [19].

These Qur'anic exhortations and Prophetic teachings led to Muslim culture taking animal welfare seriously. For example, Ibn al-Marzubān (d. 921), a medieval Muslim scholar extolled the loyalty of dogs in a book entitled, 'The book of the superiority of dogs over many of those who wear clothes' (*faḍl al-kilāb 'alā kathīr min man labisa al-thiyāb*) [20].

This brief discussion is sufficient to demonstrate that while animals are not on par with humans from an Islamic lens, as stewards of the earth humans must not seek to dominate creation but to stand with it in a caretaking relationship of it, and with respect to animals be mindful of their welfare. This theological narrative informs our exposition on 'Sunni Islamic perspectives' on xenotransplantation. Xenotransplantation or xenografting refers to transplanting organs from one species (animals) to another (humans) [21] (p. 232). We will examine ethical issues related to this practice from an Islamic perspective grounded in the Sunni schools of law. While there may be significant overlap with Islamic perspectives based on Shia schools of law, we want to ardently avoid conflation of Sunni Islam with Islam. Similarly, our chapter offers a perspective but there can be multiple authentic 'perspectives' on the issue because even within the Sunni denominations there are a plurality of views vis-à-vis bioethics. We shall attempt to underscore some of this diversity in this chapter.

The chapter is divided into a number of subsections. We start by making some general observations on Sunni ethics; and follow it with some discussions on medication and therapy (*tadāwī bi al-muḥarramāt*). We next mine the Sunni ethico-legal tradition to build an accurate understanding of xenotransplantation ethics. Finally, we deliberate on some further afield ethical issues related to the impact of controversial therapies and Muslim self-image which will assist in understanding how Sunni perspectives on xenotransplantation are arrived at and received by the general Muslim population. We conclude the chapter by adopting precaution [21]. We view xenotransplantation to be a stop-gap treatment, and call for further research into preventative medicine and alternative therapies that avoid allografts and porcine xenografts.

Sources of Sunni Ethico-Legal Deliberation

Sunni Islam is primarily nomocratic, meaning that God's Will is to be worked out through the law. Whilst Sunni law has its foundation in two primary textual sources, the Qur'an and Prophetic practice (*sunna*), the bulk of it is found in the legal interpretations of these sources by jurists documented in Islamic law collections.

The gatekeepers of the law are the jurists (*fuqahā*). They are scholars with the intellectual training and credentials needed to deduce laws from the primary sources. Their authority is constructed through an interaction between texts, discursive methods, and personified knowledge [22]. Thus, they are taken seriously as religious authorities only as long as they follow the rules of interpretation mapped out in Sunni legal theory (*uṣūl al-fiqh*). To maintain their authority, they must follow a system of precedents. New laws and deliberations need to be anchored to the Qur'an, *sunna* or commentaries of the ancient scholars similar to English common law.

While there were multiple interpretations and law schools in the formative period, by the tenth century these were reduced to four dominant Schools of Law: Ḥanafī, Shāfi'ī, Mālikī, and Ḥanbalī named after their eponymous founders. Henceforth, these legal schools function as sources of Islamic law in tandem with the primary sources. Even so, individual scholars deliberate on novel matters using analogical reasoning (*qiyās*) and other formal methods (*ijtihād*), and render non-binding legal opinions termed fatwas.

In the modern period, a new form of ethico-legal reasoning has emerged—collective legal deliberations (*ijtihād jamā'ī*) [23]. Groups of Islamic jurists and experts in other fields convene at international conferences to derive Islamic position statements, termed *qarārāt*, on novel issues. Although these *qarārāt* do not have any legal force, they have been used as the basis for law in some Muslim countries [24]. For some, these modern declarations are a substitute to the findings of the traditional schools of law, and thus transcend them [25].

Medication in Sunni Ethics and Law

Sunni perspectives on xenotransplantation ethics cannot be properly appreciated without some general discussion on medication and therapy in Islam.

While using medication and therapy is permitted by Islamic law, and according to some authorities encouraged, unlike life-saving sustenance such as food and drink it is not morally obligatory. This is unless there is a high probability that the therapy will be lifesaving [26]. At first blush, it may seem odd to even broach this topic. After all, are not diseases and seeking a cure from them an integral part of our lives? That may be the case; however, from a theological point of view, medication and therapy pose a dilemma: if everything happens in this world because God willed it, it follows that God willed illness on someone, which follows that trying to cure that illness may be viewed as challenging God's Will. Indeed, this is how some of the Companions of the Prophet understood medication when they asked him, 'Would not medication go against the Will of God?' The Prophet pacifyingly and

rhetorically responded, ‘to use medication is also according to the Will of God’ [15, 27]. Nevertheless, the fact that using medicine is not obligatory provides space to those who want to exercise a heightened level of spirituality by surrendering themselves to God’s will. At the same time, the theological position that God can cure without the need for human intermediaries, must also be preserved within the law. Hence, it cannot be judged to be sinful to forego medication and therapy, and instead choose to rely on God alone.

The discussion above is somewhat theoretical since no Sunni jurist wholly objected to the pursuit of medication and therapy by a Muslim subject. Its primary purpose was to relieve the foregoing theological tension. However, opinions are divided on using medication and therapy that is based on normatively prohibited products (*tadāwi bi al-muḥarammāt*), such as alcohol and pork. In four different verses, the Qur’an details items which are forbidden to consume [28–31]; they include carcass, blood and pork amongst others. Despite the prohibition, these things are permissible to use in cases of dire necessity (*darura*). The Qur’an reads,

You are forbidden to eat carrion; blood; pig’s meat; any animal over which any name other than God’s has been invoked; any animal strangled, or victim of a violent blow or a fall, or gored or savaged by a beast of prey, unless you still slaughter it [in the correct manner]; or anything sacrificed on idolatrous altars. [...] but if any of you is forced by hunger to eat forbidden food, with no intention of doing wrong, then God is most forgiving and merciful [28].

This is further qualified in another verse, ‘*But if someone is forced by hunger, rather than desire or excess, then God is most forgiving and most merciful*’ [30].

The above verses reveal that in cases of dire necessity one is allowed to utilise forbidden items commensurate to need. ‘Necessity’ has been defined by the Ḥanāfi scholar al-Jaṣṣāṣ (d. 981) as ‘a [subjective] fear of injury or harm to the self or limbs,’ [32] (p 1: 159).

The above Qur’anic verses are complemented or contradicted (depending on perspective) by a Prophetic statement, ‘God sent down illness and its cure and he made a cure for every illness. Therefore, seek medication but do not seek what is forbidden (*ḥarām*) as medication’ [33].

This narration could be interpreted in two ways:

1. A Muslim is permitted to seek all effective medical options as long as the therapy does not involve anything that would otherwise be prohibited.
2. A Muslim is permitted to use substances that may otherwise be prohibited if facing a dire need and this is the only viable option.

The first interpretation where prohibited items are not permissible for medication is supported by a case wherein a delegation from the cold Yemenite region of Himyar sought permission from the Prophet to drink alcohol made from wheat to help increase their body temperature [34] (p. 2: 69). Although not much detail is present in the account, some questions arise such as what alternatives were available? What

would have been the side effects? Was the only purpose to keep themselves warm or were there other motives? Bearing these questions in mind, the Prophet reminds them that the drink would still be intoxicating and by the admission of the delegation, the tribe was known to drink excessively, the side effect would be that the people would not be able to abstain from it beyond the reason stated i.e., thermoregulation.

The second interpretation is in line with the Qur'anic verses above on permission in dire necessity. The primary Prophetic precedence for this is the case of the people of 'Urayna who could not adopt well to the environment of Madina and fell seriously ill. The Prophet instructed them to drink the milk and urine of camels upon which they were cured [35]. Another precedent for this interpretation is found in the case of 'Arfajah b. Sa'd, a Companion of the Prophet, whose nose had been cut off in the battle of al-Kulāb. 'Arfajah, knowing that the use of gold is prohibited for men, had a nose made of silver. However, the silver resulted in an unbearable stench. The Prophet then himself advised that 'Arfajah have a golden nose made [33]. As such, 'Arfajah himself did not desire a golden nose or show any desire to display any gold items for that matter. The fact that the Prophet advised him to seek a golden nose attests to the fact that therapy can be sought using substances that would otherwise be prohibited for use as long as it is for a genuine need. Likewise, in cases of dire need (*ḥājah*) the Prophet recommended silk, another forbidden item for men to wear, for 'Abd al-Raḥmān b. 'Awf and Zubair b. al-'Awwām who were both suffering from chronic pruritus [16].

Based on the above, many jurists, but not all, have extrapolated the following with regards to *tadāwī bi al-muḥarammāt* [36] (11: 115–124, entry '*tadāwī*') [37–38]:

1. It is permissible in cases of dire necessity (*ḍarūra*) or extreme need (*ḥājah*) providing that the usage is proportionate to the need.
2. And the cure is definite (*yaqīn*) or highly probable (*ghalabat al-ẓann*).
3. And a halal alternative is not found.

The way this extrapolation applies to xenotransplantation is that a pig-heart transplant might be the only life-saving option for some patients. Under such circumstances receiving a pig-heart would be permissible due to dire necessity (*ḍarūra*) or extreme need (*ḥājah*). The only concern jurists might have, however, is that a pig heart transplant is still considered experimental therapy.

Xenotransplantation and Its Relationship to Allotransplantation

Sunni scholars have been discussing allotransplantation (human to human transplantation) since the 1920s with a surge of fatwas appearing from the early 1950s. Two of the authors of this chapter (Ali and Maravia) have detailed seven different positions gleaned from a reading of over a hundred fatwas in multiple languages

[39]. What is clear from these fatwas is that those who permit organ transplantation view it through the lens of necessity or extreme need. In other words, it is tolerated but not preferred as a number of disliked activities are involved including invasive surgery, prolonging burial, etc. Organ transplantation is accommodated because it is a life-saving therapy, however in the presence of an alternative, that will always be preferred providing that it can fulfil similar functions of the body. Hamdy in her anthropological study of organ transplantation in Egypt [40] writes that her interviewees who were suffering from renal failures were reluctant to receive organs from live donors because they were concerned that donors would end up having renal failure in the future. Instead, they desired cloned or synthetic organs be made available.

If in future, xenotransplantation therapy becomes as effective as allotransplantation, we predict that Islamic jurists who now advocate human to human organ transplantation will retract their fatwas and opt for xenotransplantation as the preferred option.

Animal Use in Medication and Therapy in Sunni Ethics

The use of animal products such as bone, hide, and hair have been long discussed by classical Islamic jurists [36] (18: 335–338, entry ‘*ḥayawān*’; 20: 32–38 ‘*khinzīr*’). While xenotransplant in the true sense of the word was not discussed by medieval scholars, their discussion on the use of animal parts in medication provides the foundation upon which to build a Sunni perspective on xenotransplantation [41]. It is to these foundational principles that we now turn to. How these principles are applied to xenotransplantation is discussed below in section “A Sunni View on Xenotransplantation”

With regards to using animal parts in medication and therapy, Sunni scholars take several factors into consideration. These include the type of animal, type of limbs and organs used and whether the animal was dead or alive at the time the body parts were procured. Scholars categorise animals into three types: (1) the *ḥalāl* animal: an animal which is permissible to consume after ritual slaughtering, e.g. a goat, (2) the legally clean animal: an animal which is clean according to Islamic law but not permissible to consume, e.g. a cat (3) an intrinsically impure animal not permitted to eat and not clean, e.g. a pig (although there exists a difference of opinion on this matter as will be highlighted in the next section). The *ḥalāl* animal might either die on its own, be ritually slaughtered, or be killed non-ritually. Each of these methods of death implicate the legal permission on its usage. For the other two types of animals, the method of death does not matter. Finally, body parts are divided into those parts that have a steady supply of blood (e.g., organs) and those parts that do not (e.g., bones, hair, and nails) [36] (18: 335–338, entry ‘*ḥayawān*’; [42] (pp. 534–68).

All Sunni jurists agree that a severed limb or an organ of an animal which is still alive (irrelevant of the type of animal) is ritually impure (*najis*); and grafting the severed limb into a person will render all forms of ritual worship void. This is based on the Prophet’s prohibition on his arrival to Medina when he observed

some people consuming camel humps and goat legs without slaughtering the animals. He counselled, ‘The severed limb from a living animal is a carcass!’ [15, 33]. This Prophetic reproach became the basis for Sunni scholars to declare severed limbs from living animals to be the same as a carcass. Also included among the category of ‘carcass’, and therefore ritually impure, are all dead animals with the exception of the ritually slaughtered *ḥalāl* animal. Hence it will not be permissible to utilise them in the absence of dire necessity (*ḍarūra*) or extreme need (*ḥājah*).

Returning to our discussion on pig heart transplants, the extracted heart of a pig is considered *najis* because (a) the pig cannot be slaughtered in a *halal* manner and (b) the heart is considered carcass once it has been extracted from the pig. However, as previously highlighted, dire necessity allows exceptions for such a heart to be utilised especially for the purpose of saving a life.

A Note on the Status of Pig in Islam

Since the primary source animal for xenotransplantation is a pig and porcine heart transplantation has recently been performed in a living adult [43–44], a few words related to how the pig is understood by Sunni scholars as well as its clinical need is in order. The Qur’an is clear that grazing animals are *ḥalāl* for consumption, and Islamic jurists rule that carnivores must be avoided. However, there was lack of clarity about pigs which from one perspective act like grazing animals, and from another behaved like animals of prey, i.e., they are omnivores. The Qur’an clarifies this status by associating pigs with carnivores and declaring its consumption to be forbidden except in a life-threatening situation where an alternative is not available [30]. Based on this, the majority of Sunni scholars declared the pig to be inherently impure, including its hide, sweat and saliva, dead or alive. However, the Mālikī school as well as prominent jurists such as Ibn Taymiyya (d. 1328) [45] (1: 264), al-Shawkānī (d. 1834) [46] (2: 196), and Ibn ‘Āshūr (d. 1973) [47] (5: 22) held the view that the pig is clean and only its consumption was prohibited. As for benefiting from the pig in other ways, the Ḥanafī jurist Abū Yūsuf argued that pig leather could be used after tanning [48] (1: 86) and also argued that boar bristles could be used in shoemaking [48] (1: 63).

This legal position vis-à-vis the pig undergirds a Muslim culture of almost total avoidance. Muslims do not farm pigs, and in some Muslim sub-cultures, the utterance of the word ‘pig’ may be avoided altogether. Muslim patients and jurists commonly look to animals that are *ḥalāl* for consumption such as goats and cows to use in pharmaceutical testing and biomedical research.

Yet, several reasons are given, however, for preferring pig organs or indeed a pig heart for transplantation purposes. Mohiuddin explains:

We have completely mapped the genome of a pig ... We know how a pig differs from a human and what changes are needed to make its organs acceptable in our bodies. We don’t know much about goats or cows [49].

Pigs are also the preferred choice for transplantation purposes because they reproduce frequently, they are easier to modify genetically, and their organs are similar in size to that of humans. Although chimpanzees, baboons, and gorillas are much closer matches to humans genetically, in addition to all (including pigs) carrying the risk of zoonotic viruses transferring to humans, non-human primates, especially chimpanzees, are declared to be endangered species. More important perhaps is that the dominant xenotransplantation model involves pig organs. Decades of research and millions of dollars have gone into making the pig model viable, other models have a much steeper hill to climb.

A Sunni View on Xenotransplantation

Given the restrictive conditions placed on therapy that uses normatively prohibited material (*tadāwī bi al-muḥarramāt*) and the strong sentiment against the pig borne out of an understanding of scripture, Sunni jurists advocate a hierarchy of animals that can be used for xenotransplantation, even in the case of dire necessity. Organs from a ritually slaughtered *ḥalāl* animal is the preferred, primary option. This is followed by organs from the legally clean animal such as non-human primates. Only as a last resort will Islamic scholars allow the use of porcine products [36] (11: 115–124, entry ‘*tadāwī*’) [42]. But since porcine products are the only viable option available today, Islamic jurists cautiously allow it in cases of genuine medical necessity while recommending that effort and research should be exerted in trying to find *ḥalāl* alternatives. This nuance is illustrated by the Islamic Law Council (IFC-MWL) of Mecca declared at the end of its eighth session held in January 1985 that.

The following are legally permissible *a priori*,² ... to procure an organ from a ritually slaughtered *ḥalāl* animal without reservation and from non-*ḥalāl* animals in case of necessity for transplantation into the person who is in need of it [50] (p. 77).

Similarly, the Indian Islamic Law Council in its 1989 conference concluded that

1. It is permissible to use the organs of the ritually slaughtered *halal* animal for human transplantation.
2. In the case of dire necessity where one fears for one’s life or limbs and no alternative is available, it is permissible to use the organs of non-*halal* animals or the *halal* animal which was not ritually slaughtered.
3. In cases of non-necessity, the use or porcine organs is not permissible [51] (1: 247).

Despite the above declarations, contentions about which patient-level conditions permit usage remain. Some jurists at the Indian assembly maintain that porcine

²The declaration has already discussed living donation from humans.

organs are also permissible to use in cases of extreme need (*ḥājah*), whilst others have opined that even in cases of dire necessity their use is not permissible [51] (1: 242–3). Similarly, the premier jurist al-Qaradāghī, Secretary General of the International Union of Muslim Scholars, declared that porcine transplant is permissible only in dire necessity (*ḍarūra*) and not extreme need (*ḥājah*) [52] (p. 489). Some Islamic Law Councils, like the Port Elizabeth Mujlis al-Ulama based in South Africa, declared that even in dire situations the use of porcine organs is not permissible [53] (p. 24).

Other jurists like the former rector of Al-Azhar University, Shaykh Gād al-Haqq (d. 1986) [54] (7: 356) and Shaykh ‘Atīyah Ṣaqqar (d. 1996) have permitted bone xenotransplantation, with the latter arguing in favour of a pig pancreas [55] (10: 233). The late Mufti Muhammad Shafi who categorically prohibited organ donation also recommended xenotransplantation to be further developed as a suitable alternative to allotransplantation [56] (7: 52). The former chief mufti of Saudi Arabia, Sheikh Ibn al-‘Uthaymīn (d. 2001) emphasised that the most important factor to consider concerning clinical need is what is best for the patient—as such, if a synthetic valve does not agree with the patient but a pig valve does, then the latter could be used [57]. The Sheikh further highlighted that the prohibition mentioned in the Qur’an applies only to the consumption of pig flesh.

Where a xenotransplantation is a viable option, a Muslim patient must have the right to be well-informed about its benefits, risks, and any alternatives. The onus of providing sound information rests with (a) the medical experts to provide the pros and cons of the treatment in light of statistical and scientific data, and (b) Islamic jurists who could review the medical information at hand and advise in the best interest of the Muslim patient.

In summary then, the mainstream view among Islamic jurists appears to be that xenotransplantation from pigs is contingently permissible in cases of dire necessity (*ḍarūra*) or extreme need (*ḥājah*) providing that (1) the usage is proportionate to the need, (2) cure from the therapy is definitive (*yaqīn*) or highly probable (*ghalabat al-ẓann*), and (3) a *ḥalāl* alternative is not available.

The authors of this chapter agree with the contingencies, however, believe that a judgement of permissibility is non-ideal. In contrast, we opt for a tread-with-care and watch-this space approach recognizing that xenotransplant is ‘a stop-gap intervention that is potentially life-saving’ [41]. We base our cautious approach based on the following considerations.

Islamic Concerns: Potential Religious Objections to Xenotransplantation

As has been mentioned above, using prohibited substances for medical purposes is allowed under three circumstances: (1) dire or urgent need, (2) if there is a strong possibility of cure, and (3) no *ḥalāl* alternatives are found. Xenotransplantation may be objected to because it does not satisfy some of these conditions.

Since xenotransplantation is a medical therapy, it will fall under the general ruling of medicine in Sunni Islamic law; it is treated as permissible but not obligatory unless proven to be lifesaving [41]. Yet, the status of xenotransplantation as an experimental therapy intrinsically makes it of unknown efficacy even if it appears to be life saving to the laity. The recent example of an individual receiving a pig heart but dying within weeks illustrates that this cure is illusive, and the therapy of uncertain efficacy [44, 58]. This status leads to the question that if medication and therapy itself is not obligatory in Islam, does it logically follow that Islamic law would allow for violating a prohibition against porcine usage when the outcome of the proposed therapy is uncertain? It appears to us that the criterion of certainty, or dominant probability, of cure and/or life-saving status is not met. Said another way, we worry about resorting to arguments on dire necessity off-hand. We do not believe that the existence of a threat to life or severe distress automatically allows one to violate a normative prohibition. Rather the proposed outcome must be interrogated by assessing success rates and the like. Rather than permitting porcine xenotransplantation based on the patient facing a dire need or life-threat, we weigh more heavily on evaluating the probabilities of a therapeutic outcome.

Other concerns to the recipient must also be weighed. Even though the effects of hyperacute rejection have been mitigated by genetic modification of the source animal, how much do we know about the negative immunological responses to xenotransplant? Especially given the possible risk of zoonotic risk transmission found in basic laboratory science settings. Furthermore, graft versus host diseases in primates such as baboons is well known [59]. Transgenesis involving human DNA to be implanted into pig embryo throws up another problem related to experimenting with human DNA and creating human like embryos in pigs. These all must not only be disclosed to potential recipients but must be accounted for in Islamic ethico-legal deliberation, for harms must be repelled before procuring benefits.

Sunni law also seems to be stuck in a circular mode of reasoning. Alternatives to allotransplant are always preferred position, with human organ transplantation being permitted only due to dire necessity. If xenotransplant is deemed an alternative, then it should be the preferred method to adopt, yet we see there is hesitation to take from non-*ḥalāl* animals even during necessity. The condition that the use of *ḥarām* animal organs is possible only in the absence of alternatives brings the issue back round to allotransplant. At present there seems to be confusion on what is primary and what is alternative therapy based on the juridical statements. Further legal analysis is required to break this regress.

Additionally, it is always not a straightforward case as to which option one should opt for even in the presence of a *ḥalāl* alternative. As Shaykh al-ʿUthaymīn mentions above, this should be assessed on the basis of individual cases. For example, a person facing a choice of whether to use a mechanical heart valve or a porcine heart valve, the answer immediately not need be that the mechanical heart valve is the more Islamically reliable and safe position. A mechanical heart valve will require lifelong blood thinning medication in addition to immunosuppressant medication. These will further expose the patient to infection, which can be avoided if a porcine heart valve was used. However, a porcine heart valve will need to be

replaced after 10–15 years which may not be conducive with people of 65 years of age and above. A risk-benefit analysis will decide what the best Islamic option is for a patient. Hence, we believe individual level determinations are needed as to what is the best, and ‘most Islamic’ option for a patient.

Muslim Concerns: The Impact of Controversial Therapies

Muslim patients might refuse xenotransplant from pigs and similar therapies despite their clinical needs. Such decisions may be rooted in the Prophet’s words, “*Allah has not kept cure for you in what he has made prohibited for you*” [35]. However, given the fact that the Prophet himself allowed for the use of nose moulded from gold and silk for men with severe itch conditions, both of which are normatively prohibited, Muslims may opt not to do so.

Even though the Qur’an explicitly permits—in dire situations—the use of alcohol, pork, as well as animals slaughtered non-ritually, Muslims have continued to seek alternatives. Perhaps, this drive is due to the condition in the verse ‘*as long as one does not desire it*’ [30]. Muslim scientists, therefore, throughout history despite their immense passion for medical progress tried to avoid such therapies as much as possible and sought alternatives so as not to infringe on Islamic moral principles. Although such therapies may cure a Muslim physically, side effects could involve feelings of guilt or loathsomeness affecting their spiritual and emotional well-being [60]. As such, Muslim patients may feel dissatisfied with the outcome. Due to this negative impact of xenotransplantation on Muslim patients, health care professionals must keep them well-informed about alternatives [60].

We have seen above that in cases of necessity, scholars do permit the use of forbidden items and by extension xenotransplantation from *ḥarām* source animals. Despite this, people’s self-image of their body and fear of a perception of altered subjectivity, may hinder them from using animals as sources for organs [60]. At one end is the Qur’anic understanding that humans are the most perfect of creations created in the image of God and on the other, the Qur’an is interpreted to view the pig as a pollutant (*rijs*) [30]. A juxtaposition of these two beliefs may result in viewing xenotransplantation as a confluence of the pure and the profane, the attaching of the wing of an angel on to the tail of a donkey, giving rise to a chimeric creature paradoxically human and animal. George Orwell eloquently conjures up this image

Twelve voices were shouting in anger, and they were all alike. No question, now, what has happened to the faces of the pigs. The creatures outside looked from pig to man, and from man to pig, and from pig to man again; but already it was impossible to say which was which [61].

To add to the problem, the Qur’an mentions that an entire community was transformed into pigs and monkeys as a punishment for disobeying God [62]. While no scholars have taken this aspect into consideration while issuing their verdict on xenotransplant, the issue of altered subjectivity and metamorphosis as punishment

from God may cause trepidation in some people to accept animal to human transplant for themselves or their loved ones.

Finally, whereas in the case of allotransplant, there is a sense of community and an understanding of volitional gifting, such things are missing in the case of xenotransplant. This may lead some people to feeling guilty that defenseless animals have been exploited for their selfish gains.

Conclusion

In Islamic theological anthropology, animals are servile to human beings within a relationship of stewardship where humans seek not to dominate animals. Many Prophetic reports extol the seriousness of humane treatment of animals. It is within these strict parameters and only out of dire necessity have Sunni scholars allowed the use of xenograft. In fact, they believe that more resources need to be spent in developing xenotransplantation therapy since this is the lesser of two harms, the greater harm being violating the dignity of a human donor. Based on this, most Sunni jurists do not object to xenotransplantation from pigs in cases where there is a patient-level dire necessity, no alternatives are present, and the posited treatment is efficacious. These conditions are unevenly met by xenotransplantation. Moreover, Islamic jurists advocate a hierarchy of preferred animals as follows; animals that are permitted to consume followed by animals such as primates that are judged to be clean though not for consumption, followed by juridically impure animals such as the pig. Research models for xenotransplantation should be advised of this preference in Islamic law.

Juridical views are only one out of numerous motivators of Muslim healthcare behaviours and ethical decision-making. Other factors influencing Muslims include uncertainty about negative immunological responses to the therapy, and the fear of cross-species virus transmission. Social concerns such as self-image and the perception of altered subjectivity may hinder them from receiving a xenograft irrelevant of how many fatwas permitting it is out there. Because of the uncertainty that the conditions for a dire necessity argument are met and patients may feel spiritually ill at-ease with the therapy, we view porcine xenotransplantation to be a stop-gap treatment to the problem of organ failure [21]. We advocate that the root causes of organ failure be addressed such that the need for organ replacement therapies is reduced, and that alternative animal models as well as synthetic models be researched such that allografts and porcine xenografts are not needed.

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