



The Application of Necessity to Xeno-Transplantation: Constitutional & Islamic Bioethical Perspective

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Abstract- A number of people die every year for failure of their vital organs of the body. Though, the failed organs of the human body may be replaced with the healthy one, there is the scarcity of such parts of the body. However, the idea of xeno-transplantation is one of the most viable answers to organ scarcity. Thus, biomedical researchers are very keen to promote promising research experiments related to this field. The transplantation may be of human organ to human and animal organ to human. The later one is called of xeno-transplant which is mentioned in classical Islamic law treatises and other theologies. However, the better way of meeting the scarcity of human organs is generating human organs solely through cloning. Since, contemporary scholars of the Islamic law are also in favor of such innovation viewing its permissibility. It is suggested that initiating such procedure is only acceptable to attain the highly objectives of Shariah and ensuring the fundamental rights of the individuals as guaranteed in the constitutional system of the country.

Keywords: Xeno-Transplant, Allotransplant, Allograft, Cadaveric Organs, Islamic Law, Constitution

I. INTRODUCTION

The idea of xeno-transplantation is one of the most viable answers to organ scarcity. And, in the biomedical context, the theory behind such procedure is to overcome the shortage of human organs. Islam as well as other world religions' also given vast consideration to the sanctity of human's body. Since its desecration suffices to the violation of the constitution in term of infringement of fundamental rights particularly of right to life as provided under Article 9 of the Constitution, 1973, and to the commission of an offence under Pakistan Penal Code, 1860.

Correspondingly taking one's life without legal rights or even inflicting any sort of harm, injury, and aggression against an individual is an unlawful act as prohibited by the constitutional as well as ordinary law. Thus, biomedical researchers are very keen to promote promising research experiments related to this area, because thousands of people/patients die each year due to the shortage and non-availability of human organs. Hence, the initiative of xeno-transplantation which involves implantation, infusion or transplantation of organs, tissues and other non-human living sources to the humans caused a discourse both in world faiths, bioethical and legal regime. Similar is the mandate of the constitutional system of Pakistan claiming Islam to be the state religion under Article 2 of the Constitution, 1973.

So, this research deliberated that the permissibility of xeno-transplant or treatment with animal's bones somehow mentioned in classical Islamic law treatises and other theologies. Therefore, the factual foundation and related rules will be inferred while-discussing such procedures mainly in xeno-transplant including interrelated issues under the ambit of necessity doctrine.

II. XENO-TRANSPLANT: CONCEPTUAL UNDERSTANDING

Xeno-transplant means transplantation of tissues or organs from one species to another species. In this sense, it is a procedure in which non-human organs or tissues are taken for implantation into human is called 'xeno-transplant'. Thus, any procedure which involves implantation, infusion or transplantation of organs including tissues, or other sources/non-human living-cells into the humans is said to be 'xeno-transplantation'. Since, both the humans and animals are two different species. The case of '*baby fae*' is a very good example, which was implanted a baboon's heart.

Certainly, 'transplantation, implantation, or infusion of living cells, tissues or organs between two genetically different members/individuals of the same species that are non-identical donors and

recipients, is said to be an 'allograft'. The word 'allograft' seems identical, but specifically—more or less—it is used for the skin transplantation. In consequence, transplantation, implantation, or an organ, tissues, or any other living cells, from one to another of the same species but with a different genotype is said to 'allograft' or 'allograft'. However, "in case of skin or tissue transplantation, the word iso-graft is commonly used for such procedures, while doing such method within the same species from one parts body to another is said to be an auto-transplant". For example: "moving bone from the hip to the back to fix a broken vertebra within the same body". Though, the same procedure if applied for skin-transplant commonly termed to be auto-grafting in bio-medical context. It must be known that the process of infusion or organ transplantation including non-human living cells into humans called "xeno-transplant", while applying such procedure for skin or tissues transplantation from dissimilar species termed to be "xeno-graft". Thus, in this sense, 'xeno-grafting' or 'xeno-transplantation' commonly refers to the transfer of non-human (i.e. animals) organs, tissues or any other living cells into the human.

III. XENO-TRANSPLANTATION: PURPOSE SERVED

The notion behind xeno-transplantation is to overcome the shortage of human organs. That is why biomedical researchers are very keen to promote promising research experiments related to this area, because thousands of people/patients die each year due to the shortage and non-availability of human organs. Hence, in this regard, the idea of xeno-transplant is one of the most viable answers to overcome organ scarcity. This idea is confirmed by the Islamic jurisprudence and constitutional values as embedded in the Articles 9, 14 and 38(d) of the Constitution, 1973 concerning right to life, dignity of man and public health respectively.

IV. XENO-TRANSPLANTATION TREATMENT: ORIGIN AND PROGRESS

Notably, research on organ transplantation started in 1818s, as identified by different researchers. However, xeno-transplantation started in 1950s. In the next section, we will try to quote some of the early xeno-transplants; therefore the discussion will debut in the following points.

4.1. Chimpanzee Heart Transplantation to Human

As regards to the xeno-transplantation, Dr, Hardy carried out 'xeno heart transplantation' surgery in 1964, when 'Boyd Rush'; a patient "admitted to the University of Mississippi Medical Center" on 23rd January, 1964. Actually, Dr. Hardy's team wanted to rescue patient's life, thus, xeno-transplantation is carried out. Through the surgery a heart of chimpanzee is successfully transplanted into the human body, however, around 3-4 hours after transplantation/surgery, the patient died. Even the procedure was unsuccessful, although this was the first attempt of xeno-transplantation which is made by Hardy's medical team.

4.2. Baboon/Pig's Heart Transplantation to Human

The story of 'Baby Fae' got world's attention towards xeno-transplant. Factually he was "Stephanie Fae Beauclair; known as "Baby Fae", an American infant, who was born on 14th October, 1984, with a sever disorder known as 'hypo-plastic left heart syndrome'. She became the first infant of the world, who could survive 21 days successfully after getting baboon's heart through organ transplantation procedure i.e. 'xeno-transplantation' on 26th October, 1984, at "Loma Linda university medical center, California, USA". She died on 15th November, 1984 ."

Similarly, various attempts have been made for implantation of pig's heart due to similarities." However, in our humble opinion, it is better to clone, generate human organs solely, since, scholars of the Islamic law are also in favor of such innovations viewing that it is permissible to clone human body organs, including the sex organs. The similar is the constitutional essence as our Constitution, 1973 is Islamic ideological based.

Similar contention is attributed to al-Qardāwī by many scholars; 'when it is established that human organ possibly can be cloned, it is permissible to clone human organs'. While, some religious scholars and *mufti's* are in favor to clone human organs for the purpose to replace damaged organs.

Consequently, researchers identified that "one day it will be possible to grow whole human organs from stem cells" for the purpose of organ transplantation. But ethical questions rose on the 'embryonic stem cells' due to its distraction, because whole human organ can be grown through it. However, 'adult cells' on the other hand are not controversial and negligible for the reason that their isolation does not cause destruction like embryonic stem cells. The recent research and biomedical experiments assured that scientists are one step closer to generate/grow whole human organs easily from adult stem cells.

Evidently the development of tissue transplantation can be seen in 1880–1930 due to the rapid experiments. “David Cooper in his research article stated that skin grafting started in 19th century”. But, “Emerich Ullmann who wrote his first monograph in 1914, identified various types of transplantation and surgical techniques significantly shows that he has performed tissue transplantations, such as skin, testicles, and ovaries before the start of 19th century”. In the “last quarter of 1800 century transplant techniques and its further developments took place, such as the ‘*allograft*’ where burn patients treated during the year of 1870”. Evidently the ‘*cadaver*’ skin grafting treatment introduced in 1881, and at that time it was regarded as ‘permanent solution’ for burn patients.

5.1 The Case of First Case of Kidney Transplant

In the year of 1902 a Hungarian surgeon, Emerich Ullmann, conducted his “first case of kidney transplantation, in which a dog’s kidney was transplanted into another dog”. Whereas, “in the same year (1902) Alexis Carrel; a French surgeon also published his work concerning organ transplantation’s techniques”. However, “the renal xeno-grafting i.e. cross species transplantation appeared in France in the year of 1905 where slices of rabbit kidney inserted into a ‘nephrotomy’ in a child with renal insufficiency”.

5.2 Transplantation of Pig’s Kidney into Human

In the year of 1906, ‘Mathieu Jaboulay’, another French surgeon “transplanted the left kidney of a pig into a woman suffering from ‘nephritic syndrome’, however this graft failed because of early vascular thrombosis”.

5.3 Cadaveric Organs Transplantation

Certainly, the human organ transplantation took place in 1936 in Russia, where a kidney of a dead man (aged 60th years) transplanted into a 26 years old lady. Numerous attempts have made during the year/s of 1943 to 1953, but for the first time on December 23rd, 1954 “Joseph Marry and his team transplanted a kidney from living person to another living human in Peter Bent Brigham Hospital in Boston, USA”.

On the other hand “Nadey S Hakim, a writer mistakenly referred that in January 1959, Joseph Murray and his team conducted the first successful kidney transplantation of the world”. However, “the interview of Dr. Marry clearly shows that the kidney transplantation was carried out from Ronald Herrick and transplanted into his identical twin Richard on December 23rd, 1954”. Further, “the research article of John P. Merrill which is published in 1956 evidently stated that the first successful kidney transplantation was performed in December 23rd, 1954”.

VI. USE OF ANIMALS' SKIN AND BONES: RELIGIOUS PERSPECTIVE

Animal’s organs or tissues can be used for human organ transplantation, since it is permissible to treat the patient by animal’s bone, such as sheep, cow, donkey, horse, or other animals except treatment by sources of pig and human. *Fatāwā al hindīyah* maintains permissibility of treatment by animal bones. It does allow seeking treatment even with the dog’s bone, and without any distinction, whether animal is dead or impure.

As for the pig’s hair are concerned, it is obvious that pig’s hair can be used for constipation. And it is because of necessity; al-Marghīnānī stated that however it is permissible to make use of its skin. ‘Aynī, while explaining Marghīnānī’s text, maintained: it is permissible to take benefit from the pig’s hair...., since consumption of (pig’s) meat is permitted by the text out of necessity, thus making use of its hairs is primarily permissible in case of necessity.

Similarly, it is reported from the revered *Imām* render permissible to make use of the treated (transformed) skin.” In view of al-Nawawī, pig bones (after transformation) can be used conditioned upon necessity and need, and without accessibility of lawful alternatives. Moreover, al-Shinqīṭī stated that according to Nawawī: it is allowed for starving person (in case of extreme hunger i.e. *iḍtirār*) to kill *harbī* and apostate for the purpose to alleviate his hunger. Additionally, “al-Qazwīnī maintained it is lawful to kill those who engage in war against Muslims, apostate, adulterous, etc., for the purpose to alleviate his hunger”. Thus, it is preferable to use animal’s bones, meet, and skin for the human benefits.

Further, al-Nawawī, in “*Rawḍat al-Tālibīn wa-Umdat al-Muftīn*” maintained: it is allowed, for the one who is forced by necessity, to kill the salve-worrier; who is engaged in war against Muslims, and apostate to satisfy his hunger. Similarly, he can kill the adulterer, those who engaged in war, and the one who abstains from offering prayer, and the one whose life/killing is due to revenge, thus if he finds one of this category, he can kill him for the purpose to ease his hunger. So, based on al-Nawawī’s description, “if killing of *harbī*, apostate, adulterer, and the one who’s killing is lawful in revenge (nemesis) out of necessity is permitted for *al-muḍtār*” suffices animal organs transplantation into human in case of sever ailment to avoid greater harm. Al-Shinqīṭī finally concludes that: organ transplantation from animals to human is permissible due to necessity.

Islamic organization for medical sciences of Kuwait held that “skin-grafting procedure is permissible, provided that the process should accord to the very goal of *Shariah*”. However, prior to ‘skin grafting’

certain conditions are required to be fulfilled. These conditions are: *first*) keeping in view the principle of necessity, 'patches; i.e. part of human skin obtained—for the purpose of transplantation—from his/her body or from another person live or dead, is juridically pure/clean according to *Shariah*.*Secondly*): permissibility of skin grafting is depended on: a) where such procedure is the only method available for patient's treatment; b) the resulting harm to the diner's health if any, must not exceed the acceptable limits; c) if such procedure conduces benefits to the patient body/health, provided that the probability of success is more than its failure; and d) the skin patches must be voluntarily obtained, (i.e. it should not effected through sale, or through intimidation, or by deception), however, if no volunteer is available, then required skin can be obtained on payment.*Thirdly*): if animal's skin is required for grafting, then: a) that should be of lawful animals, i.e. those which are lawful to eat in *Shariah*; b) but, skin taken from 'non-slaughtered animal's carcass' i.e. carrion, or from unlawful, impure living animals, cannot be used, except in necessity; c) pig's skin is impermissible to be used for human grafting, except for necessity, provided that there is no other lawful alternative available.*Fourthly*): the idea of 'human skin bank' is acceptable, provided that: a) skin bank must be in state/government control, or managed by a trustworthy and reliable state organization; b) skin stockpile should be proportionate to the real or expected needs of the people/patients; c) leftover human skin after transplantation should not be discarded, however, it must be buried as a sign of respect to humans component.

VII. XENO-TRANSPLANTATION IN PREVIEW OF WORLD RELIGIONS

Regardless of the religion of Islam, the issue of organ transplantation is also debated in other world religions, such as the Old Testament clearly forbids crossbreeding of distinct plants or animals. It equally prohibits sexual relations between humans and animals. Thus in this sense, "xeno-grafting or 'xeno-transplantation'" is considered to be prohibited. While many Christians feel that these medical procedures are allowed, some of them argued that even the barrier in nature to crossbreeding between species—indeed, due to the definition of species—which is factually a human construct and not a dividing line naturally.

Since, these definitions are drafted by the human and not by divine law. Hence, transfer of an organ to another unlike species does not matter, because these barriers are constantly varying due to the change from the evolutionary time. So, restrictions on cross-species transmission, cross-breeding seems to be a conservative principle as for as genetic technology is concerned. The ethical consideration, however, subject to the human's dignity, integrity and particularly their identity must not be compromised. Therefore, 'xeno-transplantation' cannot be rejected and the use of animals is allowed as along as human identity is preserved.

The Jewish law does not allow 'xeno-transplantation', since the principles of 'Jewish ethics stem from the belief that "human life should be preserved" and supersedes to the most of their religious obligations', thus transplantation, implantation or usage of animals organs through the concept of 'xeno-transplantation' is considered impure. However, there are readings that allow such procedures keeping in view the social, ethical and religious aspects of human life. Because theological ethics does not prohibit such procedures altogether, provided if conditions of 'parenthood', 'autonomy' and due care of animals are not violated.

Similar to Islam, the Judeo-Christian ethic believing on the sanctity of human life consider human killing is prohibited without a legal rights. Thus, they believe that human life is a sacred trust, and their killing is unlawful except in punishment or in time of war; it places strictures on appropriate animal use for human benefit such as for food. Many of them criticizing such kind of procedures, but many of them have divergent opinions; viewing that 'xeno-grafting' differs from 'human germ-line modification', because grafting does not carry any hereditary materials, while 'germ-line' sequences pass genetic materials to the next generation. Therefore, many of them accept 'cross-breeding' for the purpose to raise animals for human food. Some of them with difficulty accepting such procedures for organs, tissues, or any other living cells with consideration, that these however violate animal's rights.

Additionally, with regard to xeno-transplant, within the 'Catholic theology' it is believed that 'there is an intrinsic ethical imperative to healing' especially to those otherwise inhuman techniques. Although, within the Catholic faith we can find both 'positive and negative' aspects concerning to 'xeno-transplantation'. However, their theological ethics does not prohibit 'xeno-transplantation' completely, provided that the idea of 'personhood' and the basic theme of 'autonomy' must not be violated. Thus, in such procedure it is required that animals should not be used merely as instruments, rather they must be given proper attention, care and reverence.

VIII. CONCLUSION AND SUGGESTIONS

Consequently, this research clearly demonstrates that it is lawful for the patients to undergo with the procedure of xeno-transplantation out of necessity. However, in normal situation it is basically prohibited. Contemporary *Shariah* scholars including Islamic *fiqh* academies and legal edicts (*fatāwās*) along with other world theologies such as Christian, Judo-Christian, and Catholic theology including Jewish law seem elegantly in favor of such procedures viewing human's dignity and honor. Nevertheless, animal's organs or tissues can be used for humans in Islam and other world religions with due care, caution and reverence of animal's rights in these faiths. However, in Islamic law it is permissible to treat the patient by animal's bone, such as sheep, cow, donkey, horse, or other animals except treatment by pig's sources. But, *Fatāwā al hindīyah* clearly maintains permissibility of treatment by animal bones including the dog's bone, without any distinction whether animal is dead or impure. Similarly, pig's hair can be used for constipation out of necessity. In this regard, al-Marghīnānī al-Ḥanafī asserts its acceptability to make use of its skin, while 'Aynī al-Ḥanafī maintained it is tolerable to take benefit from the pig's hair..., since consumption of (pig's) meat is allowed by the text out of necessity.

Correspondingly, they are viewing that, our revered *Imām* render permissible to make use of the treated (transformed) skin. Additionally, al-Nawawī al-Shafī' opinioned that pig bones (after transformation) can be used conditioned upon necessity and need without accessibility of lawful alternatives. Moreover, al-Shinqīṭī contended that, based on al-Nawāwī's description, "if killing of *harbī*, apostate, adulterer, and the one who's killing is lawful in revenge (nemesis) out of necessity for *al-muḍtārr* to alleviate his hunger", suffices xeno-transplantation permissible due to necessity to avoid greater harm. Accordingly, the present research concludes that the recent innovations or the biomedical developments were not known to the classical jurists, and that is why articulation on organ's cloning cannot be seen in classical treatises. However, this research article recommends that, it is better to clone, generate human organs solely, since; contemporary scholars of the Islamic law are also in favor of such innovations viewing its permissibility to clone human organs, including the sex organs. Although, it is suggested here that initiating such procedure is only acceptable to attain the highly objectives of *Shariah* prior to certain conditions are required to be fulfilled, provided that the process should accord to the very goal of *Shariah* law viewing the "Islamic biomedical and bioethical norms".

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54. (فَلَا يَجُوزُ بَيْعُهُ إِهَانَةً لَهُ، وَيَجُوزُ الْإِنْتِفَاعُ بِهِ لِلْحَزْزِ لِلصَّرْوَةِ) , see, Al-Marghīnānī, *Al-Hidāyah fī Sharḥ Bidāyat al-Mubtadī*, Dār Ihyā' al-Turāth al-'Arabī, Beirut, vol. 3, p. 46
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56. (ويجوز الانتفاع به: أي بشعر الخنزير...والانتفاع بلحمه جائز عند الضرورة بالنص، فالانتفاع بشعره كان أولى عند الضرورة) , see, 'Aynī, *Binayah Sharḥ al-Hidayah*, Dār al-Kutub al-'Ilmiyah, Beirut, Lebanon, 2000, vol. 8, p. 165
57. (عَنْ الْإِمَامِ أَنَّ الْإِنْتِفَاعَ بِالْعَذِرَةِ الْخَالِصَةِ جَائِزٌ) , see, Ibn Nujaym, *Al-Baḥr al-Rā'iq Sharḥ Kanz al-Daqā'iq, wa-Miḥnat al-Khāliq*, Dār al-Kutub al-Islāmī, vol. 8, p. 226
58. Ibn Nujaym, al-Aṣghar, *Al-Nahr al-Faāiq sharḥ Kanz al-Daqā'iq*, (li-Hāfiz al-Dīn al-Nasafī), Dār al-Kutub al-Islamiyah, Beirut, 2002, vol. 3, p. 427
59. Dāmād Afandī, *Majma' al-Anhur fī Sharḥ Multaqā al-Abḥur*, Dār al-Ihyā' al-Turāth al-'Arabī, Beirut, vol. 2, p. 546
60. Ibn 'Abidīn, *Al-Durr al-Mukhtār, wa-Ḥāshiyat ibn 'Abidīn, Radd al-Muḥtār*, Dār al-Fikr, Beirut, 1992, vol. 5, 72
61. (وَلَا يَجُوزُ أَنْ يَجْبُرَهُ بِنَجْسٍ مَعَ فُذْرَتِهِ عَلَى ظَاهِرٍ يَقُومُ مَقَامَهُ فَإِنْ جَبَرَهُ بِنَجْسٍ نُظِرَ إِنْ كَانَ مُخْتِاجًا إِلَى الْجَبْرِ وَلَمْ يَجِدْ ظَاهِرًا يَقُومُ مَقَامَهُ) "Al-Nawawī, *Al-Majmū'*, vol. 3, p. 138".
62. "Al-Shinqīṭī, *Aḥkām al-Jirāḥah al-Tibbiyah wa-Āṣār al-Mutarattibah 'Alayhā*, Maktabah al-Ṣahābah, Jeddah, 1994, p. 402"
63. Op. cite note. 62, at, p. 380; see also, "Al-Nawawī, *Al-Majmū'*, vol. 9, p. 44"
64. "Al-Qazwīnī, *Al-'Aziz bi-Sharḥ al-Wajiz*, known as, *Al-Sharḥ al-Kabīr*, Dār al-Kutub al-'Ilmiyah, Beirut, 1997, vol. 1, p. 85"
65. ("فَيَجُوزُ لِلْمُضْطَّرِّ قَتْلَ الْحَزِيٍّ وَالْمَرْتَدِّ وَأَكْلَهُ قَطْعًا. وَكَذَا الرَّأْيُ الْمُخَصَّنُ، وَالْمَحَارِبُ، وَتَارِكُ الصَّلَاةِ عَلَى الْأَصْحَابِ فِيهِمْ. وَلَوْ كَانَ لَهُ) "Al-Nawawī, *Rawḍat al-Tālibīn wa-'Umdat al-Muftīn*, Al-Maktab al-Islāmī, Beirut, 1991, vol. 3, p. 284"
66. Op. cite note. 65. "Al-Anṣārī, *Ghurar al-Bahīyah fī Sharḥ al-Bahjah al-Wardīyah* (lil-Ibn al-Wardī), Dār al-Kutub al-'Ilmiyah, 1997, vol. 5, p. 178"
67. In our understanding, if killing, in such cases, is allowed then it is preferable to use animal organs for the benefit of an ailing person, since sever illness is also a kind of necessity. The Holy *Quran* recognized sever illness as a state of necessity where one is allowed to deviate from the standard rules. "Op. cite note. 62, at, pp. 380-381"
68. Op. cite note. 62, at, p. 400
69. "Proceeding of the seminar on, *Forbidden and unclean ingredients or Substances in Food Stuffs and Medicine*", held in 'Islamic Organization for Medical Sciences, Kuwait, May 22-24th 1995"
70. "Sale and purchase of skin, organ or other tissues and living cells, in the opinion of most of the classical jurists that, these cannot be sold and purchased, except Ibn Qudāmah who contended that the sale and purchase of all human body parts is permissible, since, slaves can be sold and purchased", that is why it is also allowed in case of necessity". See, Ibn Qudāmah, *Al-Mughnī*, "Dār al-Fikr, Beirut, 1985, vol. 4, p. 196, and vol. 6, p. 364"
71. Op. cite note. 69.
72. Op. cite note. 69.
73. "Harry LeVine. III, *Genetic Engineering: a reference handbook on Contemporary World Issues*, ABC-CLIO, California, USA, 2006, pp. 56-57"
74. Op. cite note. 5, at, pp. 5-6
75. Burlak, C. et al. "Xeno-transplantation literature update, May-June 2015", *Xenotransplantation*, 2015; 22 (4): 325-327; see also, Burlak, C. "Xeno-transplantation literature update, March-April 2016", *Xenotransplantation*, 2016;23(3): 249-50
76. Op. cite note. 5, at, pp. 7-8.

77. Ololade Olakanmi and Laura Purdy, "*Xeno-transplantation: for and against*", *Philosophy Now*, 2006, 55: 1-6.
78. For germ-line editing and modification, see, "Dayan, F, CRISPR Cas-9 and Islam: A religious perspective". "*Bangladesh Journal of Medical Science*". "2019; 18(1):07-13 <https://doi.org/10.3329/bjms.v18i1.39540>". See also, "Dayan, F, CRISPR Cas-9 and Islam: A religious perspective". "*Bangladesh Journal of Medical Science*". "2020; 19(1):11-16 <https://doi.org/10.3329/bjms.v19i1.43869>".
79. Op cite note. 73
80. Op cite note. 5 at, p. 6; see also, note 7 & 6 (David K. C. Cooper)