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Identify Transfer and Other Anesthesial Conditions in Face Transplantation

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A B S T R A C T

The aim of the present study was face-grafting techniques are innovative and highly complex, requiring well-defined organization of all the teams involved. Subsequent to the first report in France in 2005, there have been 17 facial allograft transplantations performed worldwide. We describe anaesthesia and postoperative management. Anaesthesia for this long procedure involves advanced planning for airway management, vascular access, technique of anaesthesia, and fluid management. Preparation and grafting phases were highly haemorrhagic (>one blood volume), requiring massive transfusion. Median (range) volumes given for packed red cell (PRC) and fresh-frozen plasma (FFP) were 64.2 ml kg (-1) and 46.2 ml kg, respectively. Blood loss quantification was difficult because of diffuse bleeding to the drapes. The management of patients with neurofibromatosis or burns involving the whole face was more difficult and haemorrhagic than the patients with lower face transplantation. Average surgical duration was 19.1 h (15-28 h). Postoperative severe graft oedema was present in most patients. Most patients encountered complications in ICU, such as renal insufficiency, acute respiratory distress syndrome, and jugular thrombosis. Opportunistic bacterial infections were a feature during the postoperative period in these highly immune suppressed patients.

Keywords: Massive transfusion, Anaesthesia, Blood loss, fluid management.

A R T I C L E I N F O

CONTENTS

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1. Introduction

A face transplant is a medical procedure to replace all or part of a person's face using tissue from a cadaver. The world's first partial face transplant on a living human was carried out in France in 2005. The world's first full-face transplant was completed in Spain in 2010. Over the past

few decades, great advancements have been made in the field of facial transplantation as per the experimental and clinical studies on trauma or congenital malformation. Over the past few decades, great advancements have been made in the field of facial transplantation as per the experimental and clinical studies on trauma or congenital malformation. Nowadays, vascularized composite tissue allo-transplantation is considered another treatment option in patients with complex craniofacial defects. This is because controversy exists regarding whether autologous facial reconstruction is optimal for them.

In 2005, facial allograft transplantation was first reported in France. Since the field of transplantation surgery has always pushed the boundaries of medicine forward. In doing so, it has repeatedly raised unprecedented ethical questions. Today, as teams around the world consider performing a human facial transplantation, the frontiers of medical ethics are again being tested. Not long ago the pressing ethical issues in transplantation concerned the scarcity of donated organs and the deaths of potential recipients that resulted from this lamentable scarcity. With the relatively recent advent of human hand transplantation, however, ethical reflection has shifted to the need to weigh the risks the patient assumes for the sake of receiving a donated organ that, unlike a heart or liver, is not necessary for his or her survival. The aim of this essay is to address these ethical issues when they arise for human facial transplantation research.

When considering facial transplantation research, the ethical concerns must be based on the scientific, surgical, psychological, and social dimensions of the procedure and its aftermath. Therefore, this article devotes considerable space to discussing these dimensions in so far as they have implications for ethics. The ethical questions that arise here are complex and, as we have indicated, unprecedented. Issues of the psychological hopes, anxieties, and stability of transplant recipients have always caused ethical concerns, but with facial transplantation, the psychological and social dimensions loom much larger: what is at stake is a person's self-image, social acceptability, and sense of normalcy as he or she subjectively experiences them. To formulate these broad concerns in the language of medical research ethics, many of the "risks" and "benefits" of the surgery seem unpredictable.

2. Materials and Methods

The descriptive cross-sectional study was conducted from February 1, 2009 to April 30, 2009 to assess the responses of people towards face and organ transplant. The study population was commuters waiting to board public vehicles at the Kejetia lorry station, Bantama /Komfo Anokye Teaching Hospital (KATH) taxi station and Buokrom Estate F-line lorry station. Traders and residents of Adum and Bantama, in Kumasi were also part of the stud population. Samples of 1020 respondents were interviewed using convenient sampling techniques after having obtained the necessary ethical approval for the study. Data collection tools were structured interview guide and focus group discussions guide for most traders and few residents. Most of the commuters read and answered the questionnaire themselves within approximately 5 minutes. Data obtained include demographic profile and items covering awareness, attitudes and beliefs towards face and organ donation. Topics related to personal willingness to donate or receive a face or an organ for transplantation, and objections to donation, religious and other beliefs towards donation were studied. The pre-tested questionnaires used for the interview were administered after each respondent had given his/her informed consent, assured about the confidentiality and ethical principles that would be followed.

Ethical Approval

The appropriate ethical approval was obtained from the Committee on Human Research, Publications and Ethics of the Kwame Nkrumah University of Science and Technology, School of Medical Sciences and Komfo Anokye Teaching Hospital, Kumasi. The ethical concept of health delivery and research was observed and complied with the Helsinki Declaration of 1975 (revised in 1983) on human experimentation.

Data Analysis

Data collected were analyzed using descriptive statistics and tests of significance (i.e. Multiple Regression Analysis) with SPSS windows version 12 (SPSS, Inc., Chicago, IL, USA).

Program and Cost of Facial Transplantation

Before the initiation of the facial transplantation program, there was disagreement over its risks and benefits. Robust research protocols, strong infrastructure, specialized personnel, and adequate financial support were considered essential factors for the success of this program. To date, only a few active facial transplantation programs have been implemented worldwide; however, there is a growing interest in these programs. Thus, they would be of help for refining highly effective multi-disciplinary protocols for recruiting patients, obtaining their written informed consent, screening them, making a preoperative plan, and performing facial transplantation and long-term postoperative follow-up. The members of the facial transplantation team are responsible for being compliant with the protocol; they include a team leader, a program manager/coordinator, Stages of face transplantation. The elapsed time from patient referral to placement on transplant waitlist may be 3 to 11 months.

Anesthesia

In the facial transplantation procedure, patients are anaesthetized; this requires the surgeons to plan in advance for airway management, vascular access, anesthetic technique, and fluid management. The preparation and grafting phases are highly hemorrhagic (> one blood volume), for which a massive blood transfusion may be required. Despite the actual methods and technology for hemostasis, there may be limitations in the management of intraoperative bleeding. Moreover, the anesthesiologist should prepare for long anesthesia during the facial allograft transplantation in patients with rapid blood loss after the reperfusion of the graft. Furthermore, hemostasis monitors may be required for urgently assisting the clinicians in making a correct, prompt diagnosis. The mean operation time

is 19.1 hours (range, 15–28 hours). Most of the patients in this series present with severe graft edema after surgery. They also encounter complications at the intensive-care-unit stage; these include renal insufficiency, acute respiratory distress syndrome, and jugular vein thrombosis. In addition, they are immunocompromised and then are vulnerable to opportunistic bacterial infections during the postoperative period. Therefore, the anesthesiologist should have detailed access to the medical history of the donor in the early planning phase, thus suggesting alternative anticoagulation for both the donor and the recipient in order to prevent the occurrence of possible complications.

Surgery Plan

In making a treatment plan for the facial transplantation, surgeons should consider the craniofacial and orthognathic factors, including both bone and soft tissue, for the purposes of restoring the normal anatomy by achieving an optimal relationship between the face and the skull base. In routine orthognathic planning based on cephalometric parameters, patients can achieve a restoration of most of the anatomical structures and thereby recover their occlusion, speech, and airway functions. Candidates are typically characterized by the extremely complex vascular anatomy arising from severe injury or multiple previous reconstructive attempts. This explains why each procedure is rigorously determined on the basis of their defects and vascular anatomy. With vascular mapping on computed tomography (CT) angiography, surgeons should evaluate the clinical relevance of the images, the concept of angiosome, the non-invasive delineation of major vessels, and current controversial issues associated with vascular anastomosis. The facial artery is mainly distributed in the facial skin envelope, thus serving as the main pedicle for many facial flaps, including those for facial transplantation. The predominant distribution of the facial artery in the facial region is commonly seen but cannot be predicted.

Beneficiaries of face Trans plant

People with faces disfigured by trauma, burns, disease, or birth defects might aesthetically benefit from the procedure. Professor Peter Butler at the Royal Free Hospital first suggested this approach in treating people with facial disfigurement in a *Lancet* article in 2002. This suggestion caused considerable debate at the time concerning the ethics of this procedure. An alternative to a face transplant is facial reconstruction, which typically involves moving the patient's own skin from their back, buttocks, thighs, or chest to their face in a series of as many as 50 operations to regain even limited functionality, and a face that is often likened to a mask or a living quilt.

Postoperative results: The initial experience demonstrated that the facial transplantation is a feasible surgical modality. It is indicated for patients with gunshot injuries who had previously undergone multiple conventional surgical reconstructive procedures but failed to obtain favorable treatment outcomes. It has been reported that the functional and aesthetic outcomes were very encouraging with good motor and sensory recovery after transplantation. The types of allografts varied according to the anatomical components forming the face as well as the amount of skin, muscle, bone, and other tissues. Patients achieved a recovery of phonation to such an extent as to talk normally. They could smile, chew, swallow, and blow normally but still had difficulty in pouting and kissing. Patients commonly had episodes of acute rejection, as predicted, which were easily controlled with increased systemic immunosuppression

3. Results and Discussion

Demographic Data

A total of 1020 respondents took part in the survey. Their ages ranged from 10 to 89 years, with a mean age of 27.50±2.98 years. Females (53.2%) outnumbered males (46.8%), whilst, majority (82.4%) of the respondents were Christians. Also, 61.8% of the respondents had gone through tertiary education.

Attributes of Face Transplant: Few (33.5%) respondents were aware of face transplant, however, most of them (70.0%) were willing to receive a new face if theirs is disfigured or donate (62.1%) theirs if they died.

Table 1

Variable	Number Percent	Number Percent
Age-group	666	65.3
10 - 29	288	28.2
30 - 49	60	5.9
50 - 69	6	0.6
70 - 89		
Gender	477	46.8
Male	543	53.2
Female		
Religion	840	82.4
Christian	123	12.0
Muslim	5	0.5
Jewish	3	0.3
Buddhist	49	4.8
Others		
Education Level	120	11.8
Primary	219	21.4
Secondary	630	61.8
Tertiary	51	5.0
Others		

Table 2 shows reasons for unwillingness receive or donate for face transplant. The majo reason for both was personal feelings.

Attributes of Organ Transplant

Most (50.6%) of the respondents were aware of organ transplant; notwithstanding, 2.8% of them had organ donor card, opted for it in the USA, England and Canada and 1.7%ha received organ transplant (skin grafting- autografts) before in KATH, Kumasi. There was a positive attitude towards organ donation or receiving. Table 3 shows the different reasons given by respondents who were not willing to donate or receive an organ transplant. Most (30.2%) of them attached religious beliefs to their reasons; whiles, personal feelings and issues of side-effect (Slight increased risk of infection (urinary tract), Diabetes, High blood pressure, Cholesterol problems, Headaches, Tremors, Slight increased risk of cancer, Skin appearance changes,

Insomnia, Depression, Mood swings) of the medications (Glucocorticoid, Calcineurin inhibitors, Anti-proliferatives, mTOR inhibitors, Monoclonal anti- IL-2Rα receptor antibodies and Polyclonal anti-T-cell antibodies) accounted for 25.9% and 20.9% respectively of the reasons given.

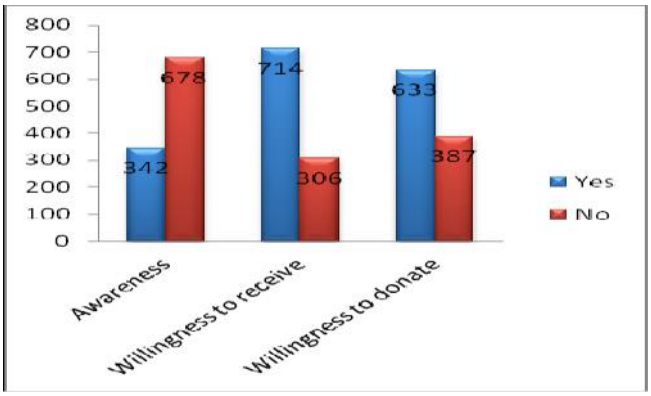

Figure 1: Respondents' attributes towards face transplant (N=1020)

Multiple Regression Analysis

A statistical significant for attitudes, awareness and demographic was identified. In terms of awareness and demographic characteristics, tertiary education and younger age (10 -39 ages) were associated with organ

Discussion

Technology in transplant continues to improve. However, there is a large gap between the number of patients waiting to receive organs and people willing to donate organs [1]. The public anyway would be needed to fill up the created gap. The level of awareness and attitudes of the public regarding transplant is very important to be able to alleviate the issue. This study was to determine the level of awareness and the attitude of people towards face and any organ transplant surgery among the people of Kumasi, Ghana. The sampling was performed and respondents were made up of different groups of people.

Awareness regarding face and Organ Transplant: The results of our study show that, the level of awareness on face transplant was low (33.5%) as compared to that of organ transplant (50.6%). A similar organ transplant study in Nigeria reveals a higher (60.0%) awareness level among 428 respondents in Lagos. 12 Also higher awareness for organ transplant had been reported by Perona *et al (*2004) in Brazil and Bapat *et al* (2010) in India. [2, 13] The relatively lower and higher level of awareness for face and organ transplant respectively in our study may be due to the publicity given to the first organ (kidney) transplant by the media. Awareness in the study was also associated with some demographic features. Tertiary educational level was associated with awareness of face transplant; whiles, organ transplant was significantly higher among those with tertiary educational level and younger ages. In a cross sectional study by Olumuyiwa *et al* (2006) a similar statistically significant association was reported for organ transplant. [12] The significant association of respondents with a tertiary level of education for both face and organ transplant may be due to assess to different types of information, hence had more knowledge on the issue as compared to the other respondents with lower levels of education. The reason for respondents of younger ages (i.e. 10–39 years) been significantly associated to organ transplant may be due to the frequent use of information for academic, entertainment, etc. especially the internet, television, radio etc. hence may have access to the information as compared to the other age groups.

Responses related to Attitudes towards Face and Organ Transplant

Majority of the respondents, from the study exhibited positive attitude towards face transplant, though their awareness level was relatively low. A higher percentage of the respondents were willing to either donate their faces when dead or accept a new face, if theirs is disfigured. This shows that the zeal for face transplant among the respondents is affirmative, hence maximum campaigns and education on face transplant is required to increase the positive attitude of the Kumasi population. Also, face transplant associations or groups should be created, since majority of the people would be willing to join. Despite the high awareness level of respondents towards organ transplant, the study shows that few had an organ donor card. Again, 1.7% of the respondents claim to have received an organ transplant before. However, majority of them were eager to either.

Table 2: Reasons for non-acceptance of face transplant if required

Reason	For willing to	
	Receive (%)	Donate (%)
Religious beliefs 75(24.5) 57(14.7)	Personal feelings 114(37.3) 204(52.7)	Unsafe 42(13.7) 60(15.5)
Cost 24(7.8) ---	Not sure 51(16.7) 66(17.1)	Total 306 387
Religious beliefs 75(24.5) 57(14.7)	Personal feelings 114(37.3) 204(52.7)	Unsafe 42(13.7) 60(15.5)
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Cost 24(7.8) ---	Not sure 51(16.7) 66(17.1)	*TOTAL 306 387*

Table 3: Reasons for non-acceptance of organ transplant if required (N= 417)

Reason Number Percent	Cost 78 18.7	Religious beliefs 126 30.2
Side-effect of medication 87 20.9	Personal feelings 108 25.9	Others 18 4.3
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4. Conclusion

In present investigation, an attempt has been made to identity transfer and other anesthesial conditions in face trans-plantation**.** It is concluded that patients with severe facial injuries accompanied by facial disfiguration are vulnerable to a poor quality of life. With the help of facial transplantation, it has become possible to achieve an optimal anatomical reconstruction. As compared to conventional methods, it can provide more desirable functional, aesthetic, and psychosocial outcomes.

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