

Xenotransplantation –View of the Transplanted Patient

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Introduction

First of all, I would like to express my gratitude to the Nordic NKVet committee for inviting me, the patient, to present my view on xenotransplantation in this forum, particularly, since many of you show concern for the animals that by means of necessity are involved in this process.

I also represent the patient organisation LNT - Landsforeningen for Nyrepasienter og Transplanterte, (in English: The Norwegian Kidney Patients Association) which is an organisation currently representing its 3.000 members of patients with kidney diseases, or who have received organ transplants in Norway.

Further, I represent Stiftelsen Organdonasjon (in English: Norwegian Organ Donation Foundation) of which I am a board member. This organisation has as its most prominent task to work on information on organ donation and to increase public awareness of the possibility to donate one's organs after death.

I have received organ transplants myself on two occasions;

- first time was way back in 1978 when I received a kidney from my mother
 - second time, in 1995 when I received a kidney from a deceased person (necrokidney)
- With this in mind I will try to convey the view of the transplanted patient.

In my presentation I will deal with the following aspects:

1. The current transplantation activities in Norway
2. The present challenge of organ transplantation- and the ideal transplantation from the patient's point of view
3. Stiftelsen Organdonasjon – (Norwegian Organ Donation Foundation)
- informing the public on organ donation- what has been done so far?
4. Xenotransplantation – is this the way to go?
5. The prospects of using stem cells in transplantations
6. Conclusions – what to do?

1. The current transplantation activities in Norway

Historically, the man Christiaan Barnard in South-Africa in 1967 was important. He made the first heart transplant carried out on a human being in the world, and this is an incidence that I myself remember well from the radio news from when I was a boy.

In Norway kidney transplantation was offered at a very early date, since routine transplantations were carried out here already in 1969. Rikshospitalet, The national hospital, is the only transplant unit in Norway, which is understand-

able in a country with little over 4.5 million people, but which makes the activities particularly vulnerable. Presently, almost 4000 necro-organs have been transplanted at Rikshospitalet since the start in 1969.

Transplantation until now has had only one major goal-which is patient survival. As patients, we are also concerned with the quality of life after the transplantation. With this I specifically mean a long life expectancy with a reasonable freedom from pain and other serious side effects. This is an area, which my organisation the LNT wishes to emphasize in the immediate future.

The number of dialysis patients is strongly increasing. At the end of 2001 a total of 720 patients received dialysis, (HD 621, PD 99) versus 317 in 1997, ie. an increase of 127 per cent in 5 years!

It is evident from these figures that something **MUST** be done to treat kidney failure!

Every dialysis patient costs close to 1 million Norwegian kroner (NOK) per year. The cost of transplantation is approximately 350.000 NOK, medicines included, the first year. From this one cannot doubt that transplantations are cost-effective both from the society's point of view as well as from the patients', and transplantation should therefore be the alternative of choice.

On January 1, 2002 a total of 230 were on a waiting list for a replacement organ. This is more than a 35% increase compared with the situation five years ago. This is a trend that is expected to continue.

2. The present challenge of organ transplantation

There is a very obvious tendency all over the western world that next of kin is not willing to donate their organs to the relative in need. In Norway the proportion of people refusing to donate organs has increased from 25 per cent in 1994 to as much as nearly 40 per cent in 2001.¹

Thus, the greatest current challenge in transplantation is to get enough human organs for transplantations as soon as possible. In the entire western region of the world the waiting lists are dramatically increasing. Thus, lack of available organs is the greatest motivator to innovation. Alternatives to human organ transplants, such as xenotransplantation and stem cell therapy, are necessary to save human lives. Representatives of Rikshospitalet have declared, that the prevalence (frequency of a disease) of patients in need for kidney failure therapy will increase in the future, both with respect to haemodialysis and transplantation. There is also a growing concern for increased treatment capacity.⁵

The next most important challenge lies in transplantation immunology. Reducing the risk of rejection of the transplanted organ does not only involve using better immunosuppressive medicines. All transplanted patients are on life-long treatment with immunosuppressive medicines. These drugs have many serious unwanted side effects, both in the short and long run. The long time side effects include change of looks, osteoporosis, increased risk of cancer, particularly skin cancer (such as malignant melanoma), and these side effects are basis for great concern for the individual patient. The only acceptable alternative for the future seen from the patient's perspective, is to replace the failing organs with organs that are as similar as possible to the patient's own.

3. Stiftelsen Organdonasjon

Stiftelsen Organdonasjon is an umbrella organisation including six patient organisations.

Stiftelsen Organdonasjon carried out a large-

¹ Torbjørn Leivestad, press release Rikshospitalet, 26.08. 2002.

² Professor Svein Aage Christoffersen (chair of the Council on Animal Ethics), hearing of The Norwegian Biotechnology Board 1998.

scale information campaign during the spring of 2002 by enclosing donor cards in the information brochure for the first time in Norway. It was released on the 19th of March, with the Minister of Health Mr. Dagfinn Høybråten signing the donorcard. Its primary goal is to increase public awareness of organ donations and the possibility for organ donation after death. Until now almost 1.5 million brochures have been distributed, i.e. 3 million donor cards to pharmacies, public libraries, doctors offices, hospitals etc. And the response was formidable, since almost 99 per cent of responders were supportive of organ donation after death and want to be of help.

The main causes of lack of organs are:

- Far from all potential donors are identified at the 27 certified donor hospitals in Norway
- In many cases, even though the donors are identified, the donation is not always carried through,
- either, because the medical personnel find it too difficult to ask the family for permission,
- or, because donation is excluded due to limited resources at the hospital,
- or, because approximately 30-40% of next of kin refuse organ donation from their deceased relative, most often because they do not know the deceased's own attitude towards organ donation.

Thus, the aim of Stiftelsen Organdonasjon is to increase the number of donations from 17.6 to 26 per million inhabitants annually, that is approximately 120 donations per year! If this goal is obtained, we are able to satisfy the total need for organ donations in Norway. The last years the number of donations per year has reached a stable plateau of 65-70.

4. Xenotransplantation – way to go?

For a number of years now society has debated the issue of xenotransplantation (the transplan-

tation of organs from one species to another, or more specifically, from animals to humans). In a world with screaming need for organs research has also focussed on the possibility to breed genetically modified pigs from which organs could be harvested and used to replace sick human organs. These animals are not fit for human food consumption- and there are many ethical considerations to be made in this respect.

I participated at the open hearing of the Norwegian Biotechnology Board in September 1998 entitled "Transplantation of organs from animals to humans- do we want this?"

Most people at this hearing were positive towards medical progress in this field, but those that expressed a negative attitude, were the experts on contagious diseases. The large and unknown danger is the diseases that may cross species, that is, those swine diseases that may infect humans through xenotransplantation. This problem has many aspects, and there is a risk that such disease may be transmitted without detection at the 4th transplantation, but appear at the 100th, and then it is too late! Such diseases may pose a threat to mankind. And then, what happens to those people that have received a xeno-organ?

The consequences of xenotransplantations for society should be further elucidated. While xenotransplantation by many people is advocated as the ultimate solution to donor organ deficits, the discussion focussing on the donor potential of human organs is put behind in the debate, a development, which worries me. Also the discussion in many ways has not emphasized the psychological consequences for the recipient of a xeno-organ. How will he or she function in a psychosocial context?

Research on xenotransplantation has come to a grinding halt in many research laboratories of the world. Mostly, this is due to the problem of fierce immune-rejection, which is a problem

not yet solved. Also, when one knows that 95% of transplantations can be carried out using human organs, xenotransplantations are only relevant to 5% of the people on the waiting list, principally those with a rare or difficult tissue type.

Immune reactions occurring after pig-to-human transplantations are much stronger than at human-to-human organ transplantations. From my point of view this means even tougher immunosuppressive treatment with even more adverse side effects for the patients. Does this provide a high quality of life for the patients?

Is xenotransplantation then really a good alternative?

Should we start on animals because people do not want to address the problem of giving away organs after death?

I am personally happy about the break in scientific progress within this area until we have had ample time to contemplate the consequences thoroughly. The ethical sides to xeno-research are another important aspect. When television programs show monkeys being operated on, having a heart transplanted to their neck to see how long it is able to function before it is rejected, this fills me with disgust, even though I have had to rely on clinical research myself, and I have seen a lot. However, what amazes me is, that we do not seem to accept this pain we inflict on animals in the name of xenotransplantation research, when we want other products from these animals, such as food and clothing. A British scientific report states, that the donor animals is exposed to so much pain that it would be unethical to use monkeys as source animals. This conclusion calls for reflection from an animal welfare point of view. Hence, I miss the broad ethical discussion with regard to xenotransplantation- where has it gone? In this area the veterinarians have to engage themselves more actively and speak out on behalf of the animals.

Illegal buying and selling of organs is an enterprise that the western world has tried to stop ever since it was revealed. We have seen photographs of poor children from the 3rd world selling one of their kidneys to get enough money to avoid starvation. Will xeno-organs become sales objects as well? When xeno-organs are offered from producers that ask a sum of money for this organ, what is then the difference from the illegal market of human organs today?

Are we in the process of looking upon humans as instruments rather than beings of their own merit?

Is then the research on xenotransplantation driven forward by the need for profit or by the human welfare?

The general board assembly of LNT (the organisation which represents the patients with kidney disease and the organ transplanted) has made a statement on the statutory proposals made by the working group on xenotransplantation, the NOU 2001:18 "Xenotransplantasjon", which points out several reservations to be made before xenotransplantation could be recommended.

5. The prospects of using stem cells in transplantations

According to my personal opinion, I would like to see the development of stem cell technology as the way to go. Within a reasonable time frame I hope that stem cell technology will make it possible to produce whole organs.

The present government wishes to limit stem cell research to that of using stem cells from adults. This attitude originates primarily from the restrictive attitude towards carrying out research on the unborn child or embryo. My perception of this is that these restrictions may hamper research on stem cells in Norway considerably. Our neighbours, Sweden, Denmark and Finland have indeed allowed research on

fertilized ova and embryos, although strictly regulated.

A statement made by the Norwegian Biotechnology Board says that the multi potent stem cells from adults harbour less developmental diversity than the pluripotent embryonic stem cells.

These cells may develop into all types of somatic cells in the human body, and this really opens up some exciting prospects for transplantation patients. Especially, since these foetus-derived cells may even be isolated from spontaneously aborted foetuses, a source that may be less problematic to accept both ethically and politically.

6. Conclusions – what to do?

Conclusively, there are three major points to address primarily to solve the problem of providing sufficient organs for the patient in need for a well functioning replacement organ:

- increase the focus on organ donation in the 27 certified organ donation hospitals
- establish a system, such as the Spanish model, involving organ donation co-ordinators in the certified hospitals
- intensify research on human stem cell technology
- more effectively preventing organ failure caused by e.g. high bloodpressure, diabetes or immune related diseases

If these four points could be fulfilled, I would prefer not to make use of xenotransplantation.