Bioethics Advisory Committee

OPINION No 11 of 20 December 1999 on the removal of organs and tissue from living, healthy subjects with a view to transplant their organ or tissue

Request for an opinion of 04.06.1998

from Dr D. BRASSEUR, Chairman of the Hospital Ethics Committee at the Queen Fabiola University Children's Hospital

"Allogeneic bone marrow transplantation (from a donor other than the recipient) is an increasingly frequent treatment owing to the growing number of accepted indications and thanks to the mastery of techniques that guarantee better therapeutic success.

However, the problem of finding a compatible donor often still remains. In the absence of compatibility in the existing systems (organ banks), at the moment calling upon a (very) close family member offers the best chances for the recipient. This situation often leads to minors related to the waiting recipient being considered as potential donors of bone marrow (or peripheral blood stem cells).

[…]

Although Belgian law does not authorise (and some neighbouring countries expressly prohibit) the collection of bone marrow from minors, this option would need to remain open if we are to give certain children or adults for whom a bone marrow transplant is currently the preferred treatment a reasonable chance of survival.

Faced with the dilemma of a 'forbidden act' and a 'vital gesture', how should doctors confronted with this choice as well as various unknown factors behave?'

During the select commission hearings, one of the experts consulted stressed that in families of Mediterranean origin, a compatible donor is more frequently found in a wider family context than that of the direct sibship owing to more frequent consanguity."

FOREWORD

In its session of 13.07.1998, the Plenary Committee decided to extend the discussion to living donors of all organs: bone marrow, kidney, liver, etc., to list only the most common transplants.

During its work, the Select Commission decided to analyse the issue of collecting and transplanting stem cells from peripheral blood[1] and from the blood of the umbilical cord as well. These practices are in fact being used more and more frequently.

The issue of transplanting nerve cells taken from foetuses to treat certain neurological disorders, in particular Parkinson's disease, will not be covered in this opinion. This technique, which is still very largely experimental, in fact raises specific ethical questions.

A. SITUATION

1. Kidney transplants

Transplanting a healthy kidney is the preferred therapeutic solution for patients suffering from chronic renal insufficiency that has reached the stage where the residual kidney function is no longer adequate for survival. Compared with the use of artificial organs (haemodialysis, peritoneal dialysis), a kidney transplant brings better quality of life, greater autonomy, fewer complications and, in the long term (over ten years), a higher survival rate.

Transplanting an organ taken from a living donor has created an ethical controversy ever since, in 1954, J. Murray carried out the first successful kidney transplant between monozygotic twins. Until recent years, kidney transplants from a healthy volunteer have remained the exception, limited to donors who are immunologically identical and close family members. In 1998, within the Eurotransplant area (Austria, Belgium, Germany, Luxembourg, Netherlands), 3,068 kidney transplants were carried out, of which 523 – or 17 % - involved a living donor; among the latter, 69 % of the transplanted kidneys came from related donors and 31 % from non-related donors. The vast majority of kidney transplants therefore involve the use of organs taken from patients who are brain dead, a procedure known in the literature as a deceased donor kidney transplant; in the past few years this technique has even enabled the removal of organs from subjects in a state of irreversible cardio-circulatory death.

In Belgium, during 1998, 361 kidney transplants were carried out, of which just 26 – or 7 % - were from living donors, the majority of these being carried out by two centres, thus reflecting a different attitude between the Belgian transplant teams as regards this issue. Similar differences were revealed between the French kidney transplant centres[2]. Moreover, it may be observed that paediatric centres are more inclined than centres treating adults to make use of living donors.

The revival in interest in transplants involving organs taken from a healthy donor – whether related or not – is motivated by the shortage of transplant organs compared with the number of patients on the waiting list. The waiting periods average 24 to 30 months in Europe and can sometimes be far longer, as is the case for instance in the state of New York where the period is four years with the result that, despite the existence of dialysis techniques that enable prolonged survival, a certain number of patients die before a transplant becomes possible. This shortage of organs is tending to increase, given the fall in the number of patients who are brain dead further

[1] 'peripheral blood stem cells' which Dr Brasseur cites as a variant of 'bone marrow' in his letter requesting an opinion.

[2] GABOLDE and HERVE, Jour.Bioethique 1998, Vol. 9, p. 141 to 148.

to road traffic accidents and cerebrovascular disorders. During the first half of 1999, the Eurotransplant report noted a fall of 6 % in the number of kidney transplants compared with the same period in 1998 (1,177 compared with 1,259). This fall did not, however, affect Belgium (150 in the first six months of 1999, compared with 101 in the same period in 1998). The transplant teams have also noted the negative effect on public attitudes of press articles referring to the possibility of organ trafficking and the failure to observe the ethical rules and legal provisions governing the removal conditions.

Shortening the waiting time is not only in the interests of the health of patients. It also enables considerable financial savings, since the cost of treatment by dialysis is substantially higher than that of a transplant.

The third argument developed to justify the revival of interest in transplants involving an organ taken from a healthy volunteer relates to the quality of the result achieved. The surgery can be scheduled and takes place in better conditions. The immunological analyses of both the recipient and the donor (determination of erythrocyte but also leukocyte blood groups) can be more detailed, as the urgency that characterises the process of removing organs from a patient who is neurologically dead no longer applies. The preparation of the recipient, the evaluation of the quality of the kidney to be transplanted, the lack of damage to the organ, something which is often encountered when a kidney is taken from a deceased donor, better definition of the transplant antigens (HLA) and the extremely short period between removal and transplant are all elements that explain why, in the short and long term, the results of kidney transplants involving living donors are better than those using kidneys from a deceased donor, even if the differences are not major. This has prompted the American transplant schools to extend the circle of living donors from the limited circle of immediate biological relations to spouses, cohabiting partners and even friends and acquaintances. In this case, the compatibility is rarely excellent. This is why Ross et al.[3] proposed the creation of a register of living donors and matched exchanges whereby an organ donated for a specific individual can be transplanted into a stranger who is more compatible provided that the initial patient can receive a kidney from another living donor.

In medical terms, donating a kidney involves low morbidity and minimal mortality estimated at around 0.026 % for the donor. In fact, long-term survival has been assured in series of several hundreds of donors. This explains why, in the U.S.A., living donors, whether related or not, accounted for almost one third of the kidneys transplanted in 1998, compared with less than 20 % ten years previously. It cannot be ruled out that in a health care system like that applied in the United States, commercial practices at least partly explain this trend in the level of living donors.

2. The liver

The main indications for liver transplants are congenital malformations of the biliary tract, hereditary metabolic anomalies, fulminant hepatitis, cirrhosis and liver cancers, all clinical situations which may require a transplant within a fairly short space of time.

Even more so than with kidney disorders, the time it takes to find a transplant can be critical here, all the more so because the ‘artificial liver’ is still only at an experimental stage and does not yet hold out the prospect of long-term survival.

With liver disorders, a great many patients awaiting a transplant will die before a suitable liver becomes available. For this reason, various techniques have been developed to divide the livers of available deceased donors on the one hand and to take a liver lobe or segment from a healthy donor on the other. Until the past few months, this second practice was used mainly in

[3] 1997

cases of liver transplants in children. The surgery involved is, admittedly, more serious, but in experienced hands morbidity and mortality remain low. The risks incurred by the living donor vivant include the following in particular:

- the risks linked to the preparatory assessment – especially the arteriographies
- the risks of per- and post-operative morbidity and mortality
- anxiety and pain
- incapacity for work: 1 to 2 months
- psychological consequences, especially if the transplant fails.

The risk linked to removal is difficult to appraise. According to Whitington[4], the risk of surgery complications may be assessed at 5 % and the risk of death at 0.5 to 1 %, i.e. a risk 20 to 40 times higher than for the removal of kidneys. To this should be added the risk inherent in anaesthesia, even if this if virtually non-existent. The complications reported are falling steadily, however, as experience is acquired, justifying the fact that these techniques are reserved for teams that carry them out regularly.

For the recipient, especially in paediatrics, transplanting a liver segment from a healthy donor brings appreciable benefits. In fact, a non-negligible percentage of these patients (10 to 20 %) die before a liver from a deceased donor becomes available.

Moreover, the long-term results of transplants from healthy donors are clearly better. As with kidneys, the benefits linked to scheduling the surgery and preparing the recipient are felt here.

3. Bone marrow and stem cells from peripheral blood

The indications for bone marrow grafts, initially limited to malignant haematological disorders, have broadened considerably in children to include the treatment of certain hereditary disorders that are incompatible with long-term survival, such as serious immune deficiencies, and in adults to include the treatment of certain solid tumours. Taking all the techniques together, the number of bone marrow transplants in Belgium rose from 274 in 1991 to 515 in 1996, and the increase is continuing, with over 700 grafts in 1998, including 30 from related donors.

The results have followed a similar trend and bone marrow transplants have become the preferred treatment for aplastic anaemia, chronic myeloid leukaemia and acute myeloid leukaemia.

A distinction is made between **autografts** – whereby a bone marrow sample is taken before chemotherapy or radiotherapy and re-injected after the treatment which could have caused medullary hypoplasia, and **allografts** – in which the bone marrow is taken from volunteer living donors, whether related or not.

The results, whatever the indication, are clearly better with related living donors. Even in cases of total identity between the HLA groups, grafts from voluntary donors not only yield less positive results, but give rise to more frequent complications, in particular GvHD - **G**raft **v**ersus **H**ost **D**isease.

A compatible donor is found within the family in just 30 % of cases, and the vast majority of these are parents, brothers and sisters. If there are no sibship donors, then the voluntary bone marrow donors file has to be used. These donors are listed in an international register which is highly structured and subject to precise regulations, defining the quality criteria to be fulfilled by the participating centres and the responsibilities of everyone involved. The terms and procedures for the selection and treatment of donors are also clearly defined. Such a possibility only proves successful in around 40 % of cases. Refinement of the techniques used to determine tissue

[4] Whitington, J. Hepatology 1996, Vol. 24, p. 625 to 627.

compatibility with a view to reducing reactions of the graft against the host still further reduce the probability of finding a compatible donor.

Collecting bone marrow involves multiple punctures in the pelvis and sternum; approximately 5 ml is taken per puncture point, which means that between 150 and 200 punctures are needed to obtain a volume of around 10 ml/kg of the recipient. The collection procedure can therefore only be carried out under general anaesthetic and takes between 60 and 120 minutes. The risks are basically those linked to general anaesthetic. In some cases, usually benign bruising and pain at the puncture points are observed.

Bone marrow transplants undertaken to treat malignant disorders involve irreversible preparation of the recipient by means of chemotherapy and radiotherapy in order to destroy the neoplastic cells, but also, consequently, most of the haematological cell lines. The possible withdrawal of the donor at this stage in the preparation of the recipient therefore poses a very serious problem and the donor and the team therefore carry a very heavy moral responsibility.

The practice of transplanting **peripheral blood stem cells** is gradually replacing that of stem cells from the bone marrow. This is a very positive development. These medullary cells, the starting points for haematological cell lines (red blood cells, white blood cells, platelets) are usually found only in small quantities in peripheral blood. After a course of chemotherapy, they increase in number. This increase may be amplified by the administration of growth factors, especially GCSF. ('**G**ranulocyte **C**olony **S**timulating **F**actor'). These factors can also be administered to healthy donors with the same result, allowing a high number of stem cells to pass into the peripheral blood on the 5th and 6th days of administration. These cells are collected using cytapheresis techniques identical to those used to isolate certain blood components. The stem cells are found in the centrifugation fraction that contains the lymphocytes and the monocytes, immunocompetent cells which, when administered to the recipient, are likely to induce the reaction of the graft against the host. Efforts are made to reduce the incidence of this by improving the separation of stem cell from the other blood cell lines.

Stem cells are usually collected from peripheral veins and this procedure only rarely requires the use of central catheters. It therefore involves only minimum discomfort.
Symptoms due to the hypocalcemia caused by the use of anticoagulants are sometimes observed.
The use of growth factors may cause bone pain and headaches.
The risk of inducing or stimulating the growth of a tumour remains theoretical, as these factors are highly specific to hematopoietic cells. No increase in the incidence of leukaemia in patients treated by these growth factors in some cases for very long period of time has so far been observed. This is the case, for example, for patients presenting chronic neutropenia (chronic fall in certain leukocyte cell lines). However, these practices are relatively recent, having been used for ten years at the very most. The available data does not therefore permit a risk in the long term to be ruled out.

4. Umbilical cord blood

The shortage of donors aggravated by the need for the best possible compatibility has prompted a search for other sources of stem cells. Placenta and the network of vessels in the umbilical cord contain 100 to 150 ml of foetal blood, which is naturally richer in stem cells than peripheral blood. Once the baby has been delivered, this blood from the cord is usually destroyed with the placenta and the annexes. By puncturing the umbilical vein and clamping the cord after childbirth, it is possible to recover around 100 ml of blood. Unlike haematopoietic bone marrow, this blood can be stored and frozen. Most of the blood collected in this way is placed at the disposal of an international bank and is therefore only rarely used for family recipients. This harmless collection is only carried out with the written consent of the mother, who waives all control over subsequent use and accepts the principle of a blood sample when the collection

procedure is carried out and after three months to screen for any transmissible disorders. She undertakes to inform the collection centre of any subsequent health problems she or her child may suffer.

In theory, this procedure involves no risk at all.

However, the quantities of stem cells obtained are usually insufficient for an adult patient. The procedure is intended mainly for transplants in children.

Current experience suggests that the requirements in terms of histocompatibility are lower for grafts involving cord blood stem cells than for those involving peripheral blood stem cells and that their use therefore offers certain advantages.

5. Lungs, intestine

Although the use of living donors is theoretically possible for lung, intestine and even pancreas transplants, the experience to date remains limited. They will therefore not be covered here.

B. THE LEGAL DATA

As far as Belgian law is concerned, two acts need to be taken into consideration to define the legal framework of the problem being analysed: **the act of 13 June 1986 on the removal and transplantation of organs**[5] and **the act of 5 July 1994 relating to blood and blood products of human origin**[6]**.** The latter repeals the **act of 7 February 1961 relating to therapeutic substances of human origin.**

I. The act of 13 June 1986 on the removal and transplantation of organs applies "to the removal of organs or tissue from the body of an individual, the donor, *with a view to* transplanting them for therapeutic purposes to the body of another individual, the recipient." It rules out the application of the act of 7 February 1961 referred to above – still in force in 1986 – to these removals and transplants. It governs both removal from living persons and removal after death.

As regards ***removal from a living, healthy donor,*** which alone concerns the Committee in this opinion, the law states that this must be "undertaken *by a doctor in a hospital"* as defined in the act of 23 December 1963 on hospitals[7], that this "transfer *may not be granted with a view to profit*, irrespective of the parties between whom it takes place", but "*for an indisputably altruistic purpose*", which should be noted by the doctor who is planning to carry out the removal. It may only be carried out *"on a donor who has* ***reached the age of 18 years*** and who has *consented in advance*". This therefore implicitly excludes all those who are incompetent, whether de jure or de facto.

Consent to removal "must be given *freely*", that is without any pressure, whether economic or from the family, "and *knowingly*". "It may be *revoked at any time*." "It must be given in writing before a witness who is of age. It will be dated and signed by the person or persons obliged to give their consent and by the of-age witness." It is given *prior* to the removal, since "proof of consent must be provided for the doctor who is planning to carry out the removal".

Finally, this consent must be *informed* in that "the doctor is obliged to inform the donor and, if appropriate, the persons whose consent is required, clearly and completely, of the

[5] Moniteur belge (Belgian official journal of 14 February 1987
[6] Moniteur belge (Belgian official journal) of 8 October 1994
[7] Currently act on hospitals coordinated on 7 August 1987

physical, psychological, family and social consequences of the removal and this doctor must note that the decision is taken with discernment."

The doctor performing the removal is responsible for checking that all these conditions have been met before carrying out the surgery.

When the ***removal may have consequences[8] for the donor or when it concerns non-regenerable organs or tissue***, the law subjects the removal to additional constraints, i.e.:

- the life of the recipient must be in danger;
- transplants using organs or tissue from a deceased donor would not yield as satisfactory a result;
- in addition to the consent of the donor, that of the co-habiting partner is required and, for donors aged between 18 and 21 years, that of the person or persons who, in accordance with the Civil Code, are required to give their consent to the marriage of a minor.

The law permits ***removal from des living donors who have not yet reached the age of 18 years*** subject to fulfilment of the following conditions[9]:

- the removal may not, under normal circumstances, have serious consequences for the donor 'or' it concerns organs or tissue that can regenerate.

There is some doubt about the sense of the conjunction 'or' (cumulative or exclusive?). Literally interpreted, a non-regenerable organ or tissue may be taken if there are no serious consequences. If interpreted taking into account the aim of the legislator and the spirit of the law, only a regenerable organ can be taken provided this does not entail any serious consequences. The second interpretation seems to be the most plausible, otherwise the law would be less demanding for organ and tissue removal from under-age donors than from of-age donors;

- the removal is intended for transplant to a brother or a sister;
- the consent of the minor who has reached the age of 15 years is required, as is that of the cohabiting spouse and that of the person or persons who, in accordance with the Civil Code, are required to give their consent to the marriage of a minor.

II. In its general provisions, **the act of 5 July 1994 on blood and blood products of human origin** stipulates that it applies to human blood and blood products *irrespective of the source of this blood* and that it governs their removal, preparation, preservation and distribution. It states that the blood or blood products may only be collected and used by a doctor or under the supervision of a doctor and that they can only be dispensed or supplied with a doctor's prescription.

"Blood and blood products may only be collected from donors who are volunteers and unremunerated and with their consent." Anonymity is standard practice, "given that the traceability of products must be guaranteed and that the identity of the donor and of the recipient may be disclosed, covered by medical secrecy, when circumstances render such communication necessary." "No blood or blood products may be collected from subjects aged under 18 years."

[8] The Dutch-language version of Article 6, § 1, of the act refers to 'removal from living persons which have serious consequences for the donor –'ernstige gevolgen' – whereas the French-language version does not include the adjective 'serious'.

[9] The statement made in the request for an opinion that Belgian law does not authorise the collection of bone marrow from minors should be qualified as the aforementioned acts of 13 June 1986 and 5 July 1994 permit the removal/collection and transplantation of tissue, organs or blood in minors under the strict conditions that they define.

However, "in cases of extreme medical necessity[10], ***collection may be also undertaken from subjects under the age of 18 years***, with the written and signed authorisation of the parents or the legal representative. Nevertheless, if the under-age child is able to express consent or an opinion, the doctor is obliged to listen to this and possibly take it into account (Article 9, indent 3)".

The quantity of blood taken may not exceed 500 ml, with a maximum value of 7.5 ml per kilogram of body weight. Blood may not be taken a second time within two months, or taken more than four times a year.

It is worth quoting Article 17, paragraph 4: "Thrombocytes, leukocytes, neocytes and ***stem cells*** may also be collected by cytapheresis. [….]. The maximum number of collections authorised is 24 per year, with a maximum of one per week, except in cases of extreme medical necessity. If the donor had to undergo prior treatment in order to obtain a sufficient concentration of cells, he must be provided with accurate information and a more in-depth medical examination [….] must be carried out." This paragraph 4 of Article 17 in the act states very clearly that ***the collection of stem cells is covered by the act on blood*** and not by the act on the removal of organs and tissue. However, the Committee feels it would be prudent to clarify ***the legal status of stem cells depending on whether they are isolated from peripheral blood or from cord blood***. In fact, if the act applies irrespective of the origin of the blood, as emphasised above, and it expressly includes stem cells in its scope of application, this renders it applicable, without any possible doubt, to the collection of stem cells from peripheral blood. The legal status of the 'collection' of stem cells from cord blood is less clearly defined. Without going into the field of semantics, it is important to define whether the collection of blood from the umbilical cord is a removal in the true sense of the work which falls within the scope of application of the act of 5 July 1994 or whether this blood which is "simply collected" since it has become available owing to the fact that the placenta no longer has a role to fulfil, is subject to a different legal system. In this second situation, this is a secondary product of a medical action that has become available further to an intervention focusing on the diagnosis or treatment of the patient. In this case, the act of 1994 would not apply since this does not constitute collection carried out on the occasion of an intervention focusing specifically on this objective. There is therefore a void, or at least a legal doubt concerning the legal status of the collection of stem cells from umbilical cord blood.

In the interests of transparency and in view of the need for medical follow-up, the authorisation of the mother is systematically required. However, given the nature of cord blood – a product collected from the placenta – the authorisation of the father is not currently requested in most cases. Local practices may play a role here. Finally, it should be noted that another approach must be adopted if the blood is collected for other purposes, such as to determine the identity of the father.

Is bone marrow collection covered by the act of 13 June 1986 on the removal and transplantation of organs or the act of 5 July 1994 on blood?

The act of 13 June 1986 does not contain any definition of the terms 'organs' and 'tissue'. The preamble to the draft law states that the above terms relate to all elements of human origin, with the exception of blood and secretions. Any list would quickly become outdated, so a broad understanding of the terms should be adopted[11].

[10] For this concept in Article 9, the Minister refers to the reply made relative to Article 5 in which this term appears and according to which "extreme medical necessity occurs when a specific blood group can only be found in the family of the recipient" – Senate, 1993-94, N° 1048-2, p. 16 and 19.

[11] Senate, 1984-1985, N° 832/2, p.4.

Meanwhile the comments on the draft for the act of 5 July 1994 on blood[12] state that the aim is to limit the scope of application of the new act compared with the act of 7 February 1961 on therapeutic elements of human origin. This restriction was described as logical since separate legislation governing the removal of organs and tissue had been drawn up in 1986. All the organs and tissue covered by the act of 13 June 1986 are consequently excluded from the scope of application of the act of 5 July 1994[13]. *It therefore appears that bone marrow falls only within the scope of application of the act of 13 June 1986*. In this respect, it is not uninteresting to point out that in France, the Public Health Code – Article 671-1 – assimilates bone marrow to an organ for the application of its provisions relating to the removal of organs.

It seems useful to refer here to the Council of Europe Convention on Human Rights and Biomedicine, even if this has so far not been signed or ratified by Belgium.

As regards the removal of organs and tissue from living donors for the purpose of transplantation more specifically, Article 19 of this convention stipulates two general conditions that do not pose problems for Belgium as they are already included in Belgian law, that is:

1. "organs or tissue […] may only be removed from a living donor in the therapeutic interest of the recipient and when no appropriate organ or tissue from a deceased person or alternative therapeutic method of comparable efficacy is available;
2. consent must have been given expressly and specifically, either in writing, or before an official body."

However, while Article 20, paragraph 1 of the Convention states that: "no organs or tissue may be removed from an individual who does not have the capacity to consent", the second paragraph contains an exception to this ban, which relates directly to the question referred to the Committee, i.e.: "exceptionally, and in the conditions of protection provided for by the law, the removal of regenerable tissue from an individual who does not have the capacity to consent may be authorised if the following conditions are fulfilled:

1. there is no compatible donor with the capacity to consent
2. the recipient is a brother or a sister of the donor
3. the donation must be likely to save the life of the recipient
4. the required authorisation has been given specifically and in writing, in accordance with the law, and with the agreement of the competent body
5. the potential donor has not refused."

The conditions laid down in points 1, 3, 4 and 5 (with the exception of minors aged over 15 years: they have to consent themselves and may therefore also refuse) are not currently included in Belgian law. The Committee recommends expressing a reservation with regard to Article 20 of the convention if Belgium were to decide to sign or ratify it and amending the act of 1986. The reservation would also make it possible not to be bound by the condition included in point 2 – the recipient is a brother or a sister of the donor – if the legislator were to opt in favour of amending the act of 13 June 1986 in exceptional situations as set out by the Committee in this opinion.

[12] Chamber, 1993-1994, N° 1229/1, p.3.

[13] It is not ruled out that an organ or tissue falls within the scope of application of both acts, such as placenta which as an organ or tissue falls under the act of 13.06.1986 and as a source of blood or blood products falls under the act of 5.07.1994.

C. ETHICAL PRINCIPLES IN QUESTION IN THE CASE OF TRANSPLANTS FROM LIVING DONORS

The removal from a healthy donor of a non-regenerable organ such as the kidney or liver, or of a regenerable organ such as bone marrow and, to a lesser extent, haematopoietic stem cells from peripheral blood or from the umbilical cord ***poses the problem of undertaking a medical action of no therapeutic benefit to the donor***. The benefit accrues solely to the recipient.

The donation of organs or tissue by a living donor is based on ***the ethical principle of the solidarity*** that human beings should show to one another, and in particular to the most vulnerable among them.

This duty of solidarity stems from the fact that human beings exist, physically but especially psychologically, culturally and economically, only through that which they receive from other human beings. This is not only an obvious fact relating to the period of childhood, but a relational reality which remains true throughout life. This relational foundation lies at the base of ethical values themselves: the human dignity of every individual depends on its being accorded to everyone by society as a whole and by each of its members. Even the autonomy of an individual is, paradoxically, upheld only by the consensus of all. The value of solidarity therefore expresses the recognition of this 'debt of assistance' which each human being owes to every other human being.

When growing up, every individual assumes the autonomy he is taught by others. This is an essential aspect of his physical and psychological identity and of his dignity. It may be that the value of solidarity comes into conflict with that of autonomy. It is generally considered that no-one is obliged to sacrifice his health or, a fortiori, his life through solidarity with another individual. It will be noted, however, that throughout its history, humanity has always glorified those who, faced with exceptional situations, have risked or sacrificed their health or even their life to help others.

In the case of transplantation, it may therefore be considered ethically praiseworthy for an individual to offer one of his organs for the health of another person. However, the risks incurred must be offset by a sufficiently important benefit for the recipient. From this point of view, the different types of transplant and the variable prognoses of these surgeries will be essential elements when assessing the ethical acceptability of donations. On the other hand, a decision like this can only be taken if the donor has real freedom of choice. The family links that often unite donor and recipient provide the motive for the donation in most cases, but they may also be the source of unacceptable moral pressure. The situation is even more difficult when the donor is too young or is mentally handicapped and cannot validly consent. In these cases, many people believe that the donation of tissue or non-regenerable organs should be refused.

The solidarity that links the members of a society should ideally be unconditional, since it lies at the source of the existence of each individual. This is the reasoning that forms the basis for the democratic principle of the equality of all human beings, a principle which we are right to consider an ethical achievement of humanity. As we are aware, this is a fragile ideal which is far from always achieved in actual fact.

The general provision is that organs (liver, kidney, eye, heart, etc.) ***are neither placed on the market nor traded***. This is why the term used is 'donation', which can only be free of charge

and the ultimate aim of which must be therapeutic. Organ donation poses the basic question of the status of the body and he freedom of the individual to dispose of his own body. Organ donation therefore implies a voluntary and aware step on the part of the potential donor, when the organ or tissue is taken from a living person. Authorising an organ and tissue market reduces the right to exist to a mercenary assessment of the value of individuals, against the affirmation of their intrinsic autonomy and dignity. One can, of course, admire the devotion of parents so lacking in means of subsistence that they would sell their own organs in order to feed their children, as was seen in India recently, for instance. In this case, it is the organisation of a society that leaves its members no other alternative that should be vehemently condemned. However, the aim of the sale of organs and tissue is not always this noble. Moreover, commercialisation can lead donors to take risks with a view to benefiting financially, which entails a limitation of free and informed consent to varying degrees and brings about an increase in potential risks for the donor. The ethical position of the purchasing recipient would be unacceptable, since it leads him to consider his own life to be worth more simply because he has financial resources. The commercialisation of organs also entails an inequality that is contrary to the principle of justice since it would very commonly be economically vulnerable people who would serve as donors for the benefit of more affluent recipients who would be capable of paying for their organs. For the recipient, there is also an increased risk linked to the fact that the donor would be tempted, for financial reasons, to conceal medical information.

It should be pointed out here that the fall in organ donation that is seen each time a real or supposed scandal emerges shows that ethical rigour generates more donations and that the shortage of organs is not an argument in favour of the commercialisation of organs and tissue.

Finally, the fragmentation of individual bodies for mercenary reasons will lead to the breakdown of society as it destroys community symbols and feelings at a fundamental level: basic solidarity, altruism, generosity, the way we look at the bodies of others and hence our relationship with others. The symbolism of donation as a pure and disinterested relationship is therefore socially essential to offset the dissociative effects of the market which recognises human relationships only by the means used to calculate interest.

The ethical position is therefore that donations do not involve the exchange of money (although compatible with compensation for the costs and inconvenience incurred) and the non-profit nature of the activities of organ and tissue or cell banks (collection, preparation, preservation, distribution), which means either that they cannot make a profit, or that if they do so, they have to reinvest it in research and development activities likely to improve their services.

As regards respect for individuals, the first imperative is the free and informed consent of the donor. The information provided plays a crucial role. The donor must be informed as fully as possible of the conditions of removal and the use to which freely donated organs or tissue may be put. If, in particular in the case of the donation of tissue and cells, these are subsequently used for an unforeseen purpose, then the donor should again be informed and consulted. A second series of problems concerns respect for the privacy, confidentiality, anonymity of the donor. Anonymity, which is usually possible in the case of voluntary donations of tissue and cells, is more difficult to guarantee in the case of organ donations and impossible with related donors.

As regards health, the basic requirement is not to use organs and tissue which do not offer ***the best guarantees in terms of functioning and the risk of transmitting infectious agents***. In

this respect, the identification of the source (traceability) and the obligation to keep full information concerning this source (deceased or living person) are vital.

D. RECOMMENDATIONS

1. The use of a living donor must bring a substantial benefit for the recipient, compared with the use of organs from deceased donors or other alternative solutions.
   The benefit is demonstrated in the case of kidney and liver transplants, primarily with a related donor. For haematopoietic bone marrow transplants, this benefit is only observed in the case of close family donors (brothers, sisters, more rarely parents). Nevertheless, in some families a comparable clinical benefit may exist between more distant collateral relatives who present a significant HLA community. The benefit may be indisputable in cases other than brothers and sisters, although at present this cannot be extended to the population in general.

   Nevertheless, the doctor should not lose sight of or conceal from donors the fact that liver and kidney transplants have a limited lifespan and rarely provide a permanent cure. However, with certain genetic disorders and certain forms of leukaemia, a bone marrow graft can lead to a cure.

2. The risk for the donor

   On the basis of the scientific literature, the risks linked to the removal of a kidney or liver are slight, even though they are considerably higher for the liver. However these are individual parameters that depend on the experience of the team and on the medical data. Nevertheless, the risks run by a given subject cannot be confined to a statistical assessment. Note, for example, the two deaths mentioned in the literature on the removal of a left liver lobe with a view to transplantation. They cannot be ignored, or concealed from potential donors. In this context, the committee recommends that this type of removal should be carried out by trained teams. The collection of bone marrow and, a fortiori, peripheral blood stem cells merely involves discomfort (which donors must also be informed of). The collection of stem cells from umbilical cord blood is harmless.

3. The donor does not gain any physical benefit. The psychological benefit of contributing towards improving the health of a loved one and undertaking an act of solidarity cannot be dismissed. Even if the transplant fails and the recipient dies, the certainty of having tried everything, of having made such a gesture of solidarity, are feelings that cannot be minimised, without however ignoring any negative reactions; hence the importance of psychological support for the donor.

4. The donation of organs and tissue must be free and disinterested. It must be an altruistic act. This rule responds to the ethical idea that the human body in whole or in part cannot be appropriated; it cannot be bought or sold. This principle does not exclude possible compensation of the donor for the inconvenience suffered. This compensation may not, however, represent a salary. Free donation is a fundamental element, essential for free consent. It is also a guarantee of quality for the recipient. The doctors involved will be attentive to any intra-family and financial pressure exerted in this respect.

5. The risk of a relationship of conversion – transfer of affection or even authority or feeling of possession between the unrelated donor and the recipient – implies anonymity as a matter of principle. This anonymity may not, of course, be observed in the case of a family donor, and is difficult in the case of the donation of a kidney or liver for which there is not as yet any organ bank of living donors. Anonymity does not rule out traceability.

6. The removal of an organ or tissue implies prior consent, freely given, following full information and expressed in writing. This consent must be revocable at any time, without the donor incurring any responsibility. However, an allogeneic bone marrow transplant involves preparing the patient with chemotherapy and radiotherapy. This preparation alters or even completely destroys the bone marrow of the recipient, rendering him dependent on the bone marrow transplant. The possible donor must be informed of this situation. In this particular case, it is difficult to understand a last-minute withdrawal on the part of donor who, having been duly informed, had given consent. This involves a reasonable period of reflection, several weeks between the start of the procedure and its fulfilment, so as to enable the donor to gather useful information and take a decision calmly.
The donor must have given consent expressly and specifically, either in writing before a witness or to a doctor who is not a member of the transplant teams.
The donor's general practitioner or the hospital ethics committee have a role to play here.

7. Informed, disinterested and voluntary consent implies competence on the part of the potential donor. From this point of view, the Committee prefers not to set an age limit, but to refer to the capacity of discernment and comprehension of the voluntary donor. Any dependence of the latter in respect of those around the potential recipient is an element which the doctors in charge cannot ignore. The help of a psychologist here appears fundamental.

8. Transplanting an organ or tissue taken from a living, healthy donor can only be considered in the interests of the recipient and when no appropriate organs or tissues taken from a deceased person or alternative and comparably effective method is available.
Given the clearly better results obtained with related donors, the collection of bone marrow – a regenerable organ – and a fortiori stem cells from those who are legally incompetent, in particular minors from the sibship of recipient or even relations other than brothers and sisters, in situations which hold out the hope of an additional benefit, may be admitted. In this context, the Committee recommends amending the act of 13 June 1986, drawing the attention of the competent authorities to the need to express a reservation regarding Article 20,2 of the Convention on Human Rights and Biomedicine should Belgium embark upon a procedure to sign or ratify this convention. The other conditions mentioned in Article 20 can be taken into Belgian law.
In this case, the prior consent of the responsible guardians will be obtained and the opinion of the legally incompetent individual heard; this will be taken into account.
Such a removal from a legally incompetent subject may, however, only be considered in **strict conditions** holding out the prospect of a good quality therapeutic result. Genetic compatibility must also be as complete as possible. The recipient must suffer from a disorder that poses a vital risk and for which the scheduled transplant constitutes the preferred therapeutic solution. These conditions will be particularly stringently applied if the removal is planned outside the direct sibship of the recipient. If the family includes donors who are of age and capable of discernment presenting the same characteristics

potentially favourable to therapeutic success, they will be preferred to the individual who is legally incompetent.
The risk for the donor must be slight, as assessed by a detailed medical appraisal.

9. The assessment of the state of health and motivation, the quality of the information received and the independence of the donor in relation to the recipient should, by analogy with that which is stipulated in Article 11 of the act of 13 June 1986, be carried out by a medical team that is independent of the transplant procedure.
As organ and tissue transplant procedures are still largely experimental, it is important that the assessment of the donor and the organ and tissue removal procedures are carried out by acknowledged teams which have been scientifically and ethically assessed beforehand.

10. It would be worth clarifying the legal status of stem cells from peripheral blood and even more so those from umbilical cord blood. The status of cord blood in particular, blood recovered upon the birth of the child from the placenta which no longer serves any purpose, should only require the simplest possible legal procedure in order to promote its use. The Committee recommends obtaining the consent of the mother only, as it will be necessary to ensure her state of health subsequently. This cord blood, which would otherwise be destroyed, should therefore be given a status that permits the best possible use to be made of it.

The opinion was prepared in the select commission 98/1, consisting of:

Joint chairpersons	Joint reporters	Members	Member of the Bureau
A.Van Orshoven (interim) A. Andre G. Verdonk	G. Rorive E. Eggermont	A. Andre G. Biname M. Bonduelle M. Lamy G. Verdonk R. Winkler	A. Van Orshoven

Secretariat member: M. Bosson

External experts consulted:

- M. Y. Beguin, Haematologist, Head of haematopoietic stem cell transplants at CHU Sart Tilman, Liège
- Ms A. Ferster, Doctor, Assistant Head of Clinic, Haematology-Oncology Unit, HUDERF (Queen Fabiola University Children's Hospital)
- M. L. Muylle, Doctor in Chief, Director, Blood Service, Red Cross
- M. H. Nys, Professor of medical law, KULeuven
- Ms M. Poelman, Doctor, Coordinator Marrow Donor Program Belgium-Registry

The working documents of the select commission 98/1 – questions, personal contributions of the members, minutes of the meetings, documents consulted – are stored as Annexes 98/1 at the Committee's documentation centre and may be consulted and copied.