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Regionalization of donor organ procurement: first experiences in southern Bavaria and results of a regional donor hospital survey

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Abstract In order to improve organizational, qualitative, and economic aspects of organ procurement, a model of regionalization was established in the local area of southern Bavaria, as from September 1993, with the following characteristics. A collaborative 24 h-duty schedule with surgeons from all active regional transplant programs. Surgeons are grouped according to their operative qualification level: (1) Group I, capable of retrieving all abdominal organs (liver, pancreas, kidney), (2) Group II, capable of removing kidneys, and (3) Group III, surgical assistance in procurement procedures. All donor organs in the local region are explanted by the local team and foreign recipient centers are supplied with the organs removed by a standardized technique. Only three times during the first, and not once during the second year, did a foreign team insist on traveling to our region to perform a liver retrieval. A survey clearly documented univocal acceptance of this model by donor hospital executives. Simplified organization and less disturbance in operating theaters were among the most frequent arguments in favor, and the familiarity of explant teams in donor hospitals was considered advantageous. Most donor hospitals do not expect to profit in terms of financial savings. When asked for further possible measures to improve organ donation, a clearer legal situation, but also the need for more information and education programs, including better media representation of transplant issues, were cited most frequently. An improvement in financial reimbursements for the donor hospitals as an instrument to enhance willingness for organ donation was not considered essential. In conclusion, our model of regionalization of organ procurement proved to be effective in achieving a high quality of organ retrieval and a reduction in personnel requirements for the transplant centers. In addition, the response from donor hospitals was unequivocally positive and may, thus, positively influence donor activity. Relevant financial savings can result from reduced on-call duties and minimized traveling costs. Further attempts to rationalize organ procurement could possibly include heart(-/lung)surgeons in the regionalized teams.

Key words Donor organ procurement · Abdominal organs · Local procurement teams

Introduction

Transplant programs, as a part of the general trend in health care, are increasingly experiencing pressure on budgets and limitations of personnel and organizational resources. On the contrary, there is a constant challenge to improve the results of clinical organ transplantation and the procedures involved, one of them being the standards of organ procurement and, thus, the quality and quantity of organs retrieved.

In an attempt to enhance the performance of our local program, we decided to reorganize the practice of abdominal organ procurement in the region of southern Bavaria. Until September 1993, only a team of surgeons for the retrieval of donor kidneys in the region had been established and organized by the transplant head office in Munich. When multiple organ donors were reported, the procurement of other abdominal organs (liver, pancreas) was carried out by the retrieval team of the transplant program to which the respective organ had been allocated by Eurotransplant, Leiden (ET). As a consequence, all three departments with active transplant programs for liver and/or pancreas were forced to run an individual "on-call" schedule for the procurement of organs potentially offered to them by ET, and so, at any given time, up to nine surgeons and perfusion technicians were on-call simultaneously. When organs from the southern Bavarian region had been allocated to recipients of remote transplant programs, the respective centers had to organize for their own procurement teams to travel to the donor hospital in southern Bavaria. For the donor hospital, this could lead to the following typical scenario: A 27-year-old male is confirmed dead from brain trauma. The next of kin (wife and parents) agree to multiple organ donation and the donor is reported via the transplant office in Munich to ET. The liver is allocated to a high-urgency recipient in Berlin, the pancreas is accepted by a team from Brussels, and the heart/lung is accepted by a center in Munich. Procurement commences after all the teams have organized and confirmed their participation. The local kidney team (two surgeons, and a perfusion technician) begin with the removal of the kidney. The heart-lung team arrives (two surgeons and two technicians), perform a bronchoscopy, and then open the chest and inspect the lung and heart. The liver team then arrives (two surgeons, one technician, and one visiting doctor from abroad), the surgeons scrub, and inspect the liver anatomy and quality. Finally, the pancreas team arrives (two surgeons and one technician), the surgeons scrub, and inspect the pancreas. Discussions on preferred means of cannulation, techniques of retrieval, anatomical variations, length of desired vascular structures, and who will do what and when follow. The Theater nurse is confronted with a variety of different requests for material and instruments and the anesthetist is confronted with a variety of (redundant) questions on donor condition, plus various requests for blood samples, specific drug applications, etc. Technicians and organizing personnel from each team require (repeated!) telephone contact to their own centers. It is obvious, that such a complex procurement scenario is highly demanding for the resources of the donor hospital, aside from the problems of cost and timing of transportation for each individual team. In addition, even with optimal cooperation of teams, a prolongation of the procedure is inevitable.

Thus, it was planned to establish a collaborative procurement team for all abdominal organs in the region of southern Bavaria. This team was to be centrally organized by the transplant head office in Munich and was to be responsible for the retrieval of organs both for regional use and for "export" to other ET centers.

Material and methods

In order to realize a regionalized procurement, a 24-hour, on-call schedule was designed as follows: (1) one surgeon "group I" (= qualified to remove all abdominal organs), (2) one surgeon "group II" (= qualified to remove kidneys only), (3) one surgeon "group III" (= qualified to assist in above operations), and (4) one perfusion technician. The surgeons were derived from the teams of all three active transplant centers in the region and were stratified according to their surgical skills into Groups I–III to participate in the on-call duties in weekly rotations. Reimbursement and insurance were standardized and taken care of by the transplant head office. In any given donor situation, a team of normally two surgeons and the perfusion technician would be transfered to the donor hospital to perform the necessary procurement. If desired, technical requirements could be discussed with the recipient hospitals in advance. Timing of the procurement and shipping of the organs was also organized by the transplant head office and the details of all procurement activities were documented there prospectively.

In order to be able to assess the opinions of the executives of the regional donor hospitals, as well as to inform them about the new concept of regionalized organ procurement, a survey was performed. A personal letter of information accompanied by a questionnaire was mailed to the clinic directors and heads of intensive care units in 46 representative donor hospitals in the region of southern Bavaria. The questionnaire allowed the candidates to: (1) express their approval/disapproval of the new concept on a scale of 1 to 5 ("very favorable ... indifferent ... unfavorable), (2) to express in more detail what they considered to be the main advantages of the new concept by checking appropriate boxes, (3) to choose one or multiple items from a list of factors that might help to improve donor activity in their domain of responsibility, and (4) to make individual comments or requests. The questionnaires were anonymous unless the candidates wished to identify themselves.

Table 1 Abdominal organ procurement in the region of southern Bavaria from September 1993 to August 1995 (*MOD* multiple organ donors)

Time period	Kidneys	Livers	Pancreata[a]	MOD
9/93–8/94	167	35	11	46/87 = 53 %
9/94–8/95	174	47	14	62/92 = 67 %
Total	341	82	25	108/179 = 60 %

[a] Only pancreata for solid organ transplantation listed

Results

In the two years following the introduction of the new retrieval concept, a total of 179 organ donors were reported to the transplant office from 30 different hospitals. The figures for the time periods September 1993 to August 1994 and September 1994 to August 1995 are given in Table 1.

In addition to these regional procurement activities, the retrieval team had to travel to remote regions in order to explant livers allocated to one of the regional centers (Klinikum Großhadern der LMU/Klinikum Rechts der Isar der TU) on 35 occasions in the 2-year period. When the activities of the year 1994 were analyzed, the procurement teams had to perform, on average, slightly more than two operations per week, but the distribution of activities was rather wide. It ranged from no procurements in 7 out of 52 weeks, to four to seven procedures in 10 out of 52 weeks, with an intermediate pensum of one to three procurements in 35 out of 52 weeks.

In the period between September 1993 and August 1994, 20 locally procured livers were shipped to other centers in the ET region to which the organs had been allocated. On three occasions, remote transplant teams insisted on traveling to the southern Bavarian region to perform the judgement of organ suitability and retrieval themselves (in two of these occasions, the organs were rejected for medical reasons). In the period between September 1994 and August 1995, 47 livers were procured locally by our team and of these, 29 (62 %) were shipped to other destinations, and in no case did foreign teams express reluctance to rely on our judgement of organ viability or our technique of organ retrieval.

From the questionnaires mailed to the regional donor hospitals, 26/46 (57 %) were returned within 8 weeks and formed the basis of this evaluation. Concerning the general approval of regionalization, 26/26 (100 %) chose grades 4 and 5 of the answering scale and, thus, expressed a high level of appreciation of the new concept. The results of the evaluation of the detailed questions are as follows. What are, in your opinion, the main (potential) advantages of the proposed new concept of regionalization of organ procurement (multiple answers possible):

1. Organizational simplification 89 %
2. Operating theater relief 69 %
3. Less disturbance in donor hospital 52 %
4. Procurement teams familiar to donor hospitals 58 %
5. Possible cost reduction for donor hospital 23 %

Which measures could, in your opinion, help to further increase donor availability in the future (multiple answers possible):

1. More information/educational activities 42 %
2. Transplant law /clearer legislation 81 %
3. Better media representation 46 %
4. Higher reimbursements for donor hospitals 4 %

In addition, 7/26 (27 %) of the hospital executives who answered the questionnaire took the opportunity of making individual remarks and comments. These were as follows:

1. General practitioners need more information on transplantation and organ donation.
2. More information material must be distributed to the public.
3. Young doctors need better education on donor conditioning.
4. The potential donor's relatives are frequently hesitant to agree to organ donation.
5. Failure to define a clear transplantation law discourages doctors from asking for permission for organ retrieval.
6. Disasterous media coverage on questions of brain death and organ trade raises doubts.
7. Sometimes there is a lack of respect toward the deceased donor by the procurement teams.

The actual overall cost savings that could be achieved after the implementation of the regionalized procurement concept were not evaluated in this study, but the significant reduction in the number of surgeons and technicians on call, as well as the fact that numerous transplants exported to other regions were shipped by regular airline services, suggests that significant savings could be made.

Discussion

Until very recently, the procurement of multiorgan donors lacked characteristics of rationalization, in that, for the retrieval of abdominal organs alone, up to three teams with three or four members each traveled to the donor hospital. This is not only a great strain on material resources (transport costs, costs for the procurement team labor, etc.), but in addition often proved to be a serious source of disturbance for the local donor hospital. On the other hand, techniques of organ preservation and retrieval have progressed [1–4], and results of recent publications [5–7] as well as personal communica-

tions on various occasions indicated a growing tendency of centers to agree on common standards of judgement on organ quality and procurement techniques not only for the kidney, but also for the liver and pancreas. This lead to our new concept of regionalization of organ procurement, which was implemented in the region of southern Bavaria in September 1993 and has been in effect since then. Its main characteristics are a collaborative "on-call" schedule with participants of all active transplant programs in the region, stratified according to their level of surgical skill. This team should be responsible for virtually any procurement of abdominal organs in the region and would make it unneccessary for foreign teams to have to travel to the region of southern Bavaria to procure organs allocated to them. Instead, organs would be procured locally by a standardized technique and shipped to their final destination, preferably by regular airline services. The possible advantages of this concept are mainly: (1) simplification of organization and timing of procurements, (2) a significant reduction in personnel resources by avoiding redundant on-call schedules and an unnecessary multitude of transplant surgeons participating in the procurement procedure, (3) advantages from the viewpoint of donor hospitals by simplifying the event of multiorgan donation, and (4) additional financial savings by the preferred use of regular airline carriers for the shipment of organs, rather than chartered aircrafts for the whole procurement team [8].

The experiences with our concept of regionalized organ procurement have been positive throughout. There were no serious complaints from remote centers about the quality of imported organs, and the fact that, in the second year, no foreign team insisted on participating in the procurement of livers or pancreata allocated to them is a good indicator of agreement on retrieval standards. As a further measure of quality control, a follow-up form has been designed for liver grafts and this is shipped along with every organ; the results of this prospective assessment will be published in the near future. The response of (potential) donor hospitals in our region has been very positive, as can be concluded from the results of the survey: organizational simplification, relief of operating theaters, and avoidance of disturbance in the hospital are all considered important points. In addition, it seems to be of advantage to the donor hospitals to know the teams (and the transplant centers in charge) personally. For the donor hospitals, the argument of cost reduction seems to play a less important role, as indicated by only 29 % of positive answers in this regard. On the other hand, it was very informative to learn about the attitude toward other measures with potential positive effect on organ donation. The urgent need for a comprehensive and clear transplant law in Germany is expressed by 81 % of those responding to our questionnaire and is in good agreement with previous reports [9–11]. Further efforts in education of both the public and of medical professionals, and a better media representation were cited by 42 % and 46 % of candidates, respectively, and this underlines the necessity of ongoing activities in this regard. Nevertheless, the discrepancy between the declared support of organ donation and actual consent rates is a known phenomenon [12, 13]. Again, the improvement in financial reimbursements of donor hospitals seems to be of subordinate importance and was mentioned in only 4 % of forms and, thus, does not reflect the situation in the USA [14].

In conclusion, our new concept of regionalization of organ procurement proved to be effective in achieving a high quality of organ retrieval with, at the same time, a reduction of personnel requirements for the transplant centers. In addition, the response of donor hospitals was positive and may, thus, positively influence donor activity in the future. The evaluation of the survey helped to identify problems and give directions for possible improvements in the cooperation of transplant centers and donor hospitals, and future activities. Also, it informed the donor hospitals about the new concept. Relevant financial savings can result from reduced on-call duties and minimized traveling costs; this will be evaluated in more detail in the future. Further attempts to rationalize organ procurement could possibly include heart(-/lung)surgeons in the regionalized teams or even the delegation of thoracic organ retrieval into the responsibility of one multiorgan retrieval team.

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