

Expected number of deaths in the liver transplantation waiting list in the state of São Paulo, Brazil

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São Paulo is the pioneer Brazilian state in transplantation surgery. The biggest challenge facing the field of transplantation is the critical shortage of donor organs, which has led to a dramatic increase in the number of patients on the waiting-list as well as in their waiting time for transplantation.

In a previous work [1], we projected the size of the waiting-list of Sao Paulo State in comparison with the number of transplantations carried out in the same period. We demonstrated [1] that the list size grows at a rate much higher than the number of transplantations actually performed.

We wish to report the expected number of deaths in the waiting-list of liver transplantation in the State of São Paulo for a projected period of 10 years starting from the year 2005.

Material and results

We collected official data from State Center of Transplantation – State Secretariat of São Paulo about our liver transplantation program for the period between July 1997 and October 2004. Only cadaver liver transplantation was recorded. Living-related liver transplantation was excluded.

The data related to the actual number of liver transplantation, Tr , and the incidence of new patients in the list, I , in the State of São Paulo since 1997 can be seen in Table 1.

Table 1. Actual number of liver transplantation (Tr) and the incidence of new patients in the waiting list (I) since 1997, in the State of Sao Paulo, Brazil.

Year	Tr	I
1997	63	
1998	160	553
1999	188	923
2000	238	1074
2001	244	1248
2002	242	1486
2003	289	1564
2004	295	1500

We took the data of Tr and that of I from Table 1 and fitted a continuous curve by the method of maximum likelihood [2] to project the number of transplantations, Tr , and the incidence of new patients in the list, I , in future. Next, we calculated the number of deaths in the list assuming an average survival time in the list of 18 months and assuming also that death is the inexorable fate of these patients. Taking the difference between the incidence of new cases and the incidence of transplantations allowed the calculation of the number of deaths in the waiting list.

The results, projected for 10 years from 2005 can be visualized in Fig. 1.

Discussion

Liver transplantation was first performed at University of Sao Paulo School of Medicine in 1968 [3]. Since then, the patient waiting-list for liver transplantation has increased by approximately 150 new cases per month, all being referred to a single list at the central organ procurement organization.

The gap between the number of available organs from deceased donors and the number of patients in the waiting-list continues to widen each year. Liver transplantation has increased, approximately, 1.84-fold (from 160 to 295) from 1988 to 2004. In contrast, the number of patients in the liver waiting-list has jumped by 2.71 fold (from 553 to 1500). As a result of this, the number of deaths on the liver waiting-list has moved to a higher level from 321 to 671 increasing 2.09 fold.

The present study found that 4.7 liver transplantations were performed per million inhabitants in 2003 when we should have performed at least 33 transplantations per million inhabitants [4].

As the liver is a limited national resource, our proposals are: (i) to improve organ donation campaign as we have not yet reached the full capacity of donation (currently 7.09 per million inhabitants) [4]. (ii) To concentrate on funding resources to public university hospitals to improve the liver transplantation performance. (iii) To change the law to start using nonheart-beating donors (NHBD).

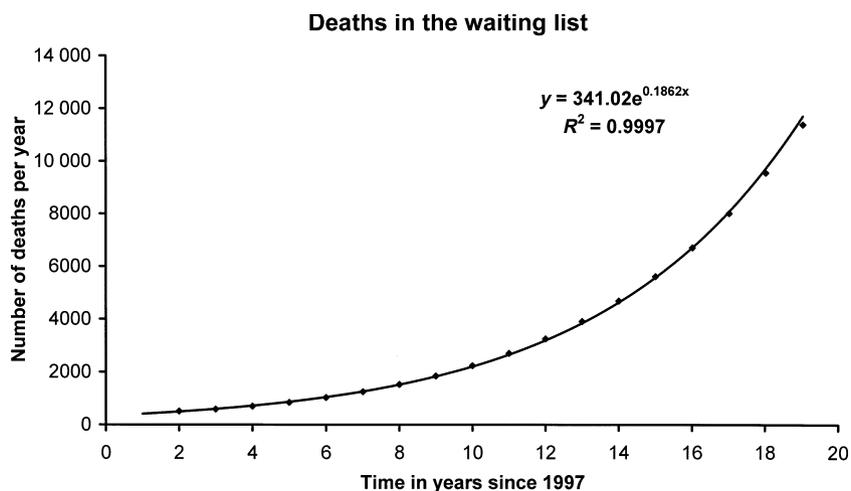


Figure 1 Projected number of deaths in the liver transplantation waiting-list in the State of Sao Paulo, Brazil.

Nonheart-beating donors programs remain unpopular despite the potential to increase the donor pool by up to 30% [5]. A number of legal, ethical and logistic reasons as well as medical concerns are responsible for this and have even compromised existing NHBD programs [6].

In conclusion, provided the conditions of the present study remain unchanged, the number of deaths in the liver transplantation waiting-list will grow in an exponential way in the years to come. Therefore, there is an urgent need both for increasing the number of liver transplantation in the State of São Paulo and for changing the law introducing nonheart-beating donors to avoid the overwhelming number of deaths in the liver transplantation waiting-list.

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