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The world’s first sextuplet liver cross-transplant was performed in Malatya.

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At the İnönü University Liver Transplant Institute in Malatya, the world's first six-patient cross-liver transplant was performed. The transplants were carried out using a system developed for the first time, utilizing optimization and economic design principles. Within the year and a half that the system has been active, the center also performed the world's first quadruple and quintuple cross-liver transplants.

Patients are exchanging donors.

In Türkiye, 80% of organ transplants are performed using living donors. However, only 30-40% of donors are able to donate to a close relative. A donor who is medically incompatible with a close relative may often be compatible with another patient.

Similarly, a patient may be incompatible with their own donor but compatible with another patient's donor. In such cases, a medically compatible donor can be found for these patients if they exchange donors. The method where two or more patients exchange donors to obtain a medically compatible transplant for each is known as cross-liver transplantation.



One after the other

Developed by Boston College economics professors Tayfun Sönmez and Utku Ünver, the system is based on a series of academic studies on kidney and liver cross-transplants. Named after Sönmez's wife, who passed away in 2016, the Banu Bedestenci Sönmez Liver Transplant System aims to deliver organs to patients in the most effective way.

The consecutive transplants performed under the leadership of Prof. Dr. Sezai Yılmaz, Director of the İnönü University Liver Transplant Institute, have propelled Malatya, one of the provinces hit by the February 6th earthquake, to the global leadership in multiple cross-liver transplants.

Record after record.

All of the world's first six-way, two five-way, and four four-way cross-transplants were performed in Malatya. Furthermore, nine of the eleven triple cross-transplants performed worldwide to date were also carried out in Malatya.

In other words, 80-90% of global cross-liver transplants are performed in Malatya

each year. A total of 85 liver patients have been given a new lease on life thanks to the Banu Bedestenci Sönmez Liver Transplant System.

Simultaneous surgeries in 12 operating rooms.



The latest six-patient cross-transplant at İnönü University Liver Transplant Institute involved four men aged 38, 39, 53, and 59, a 62-year-old woman, and a 10-year-old boy. Matching six patients and six donors wasn't the end of the process. To ensure that neither the patients nor the donors withdrew, 12 operating rooms and 12 teams performed the surgeries simultaneously. Over 100 physicians and healthcare professionals participated in the transplants, led by Professor Dr. Sezai Yılmaz.

The system was groundbreaking.



Responding to Diken's questions, Yılmaz stated that they are the 'only center ' capable of performing multiple cross-transplants thanks to their team, experience, infrastructure, and equipment . He noted that they utilize 100% of their operating room and intensive care capacity, and emphasized that they have the capacity to serve patients from abroad as well.



Yılmaz, explaining that they have gained great experience in multiple transplants, continued: **“This is a multidisciplinary success story. Sönmez and Ünver found us from Boston. Thanks to the system and formula they developed, we were able to perform multiple transplants. We have a very good collaboration. I thank them very much. Their enthusiasm excites us greatly. Together, we have created a world model. The system has revolutionized liver transplantation. Only 30% of the patients who come to us with a donor can continue. 70% are left out, meaning they cannot have surgery because their donor is not suitable. Through cross-matching, suitable organs can be found for donor exchange.”**

The size of the liver is important.

Certain criteria determine which donors are suitable for patients and to what extent. The first criterion is the blood type of both the patient and the donor. Blood type compatibility between the donor and the patient is essential. However, the same blood type is more advantageous.

Another criterion is the patient's weight. This determines the size of the necessary graft (liver graft). In adult patients, the graft size should be in the range of 0.8-2 percent of body weight. However, a range of 1-1.2 percent gives the best results.

Anatomical structure and other factors in donors determine whether the right or left lobe can be donated. The left lobe generally constitutes 25-40% of the liver, while the right lobe constitutes 60-75%. The donor must retain at least 30% of their liver. Therefore, individuals with a right lobe exceeding 70% cannot donate their right lobe. The left lobe, on the other hand, is often anatomically unsuitable, and even if suitable, its size means it can only be transplanted to pediatric patients.

Getting past a six-way cross isn't ideal.

Theoretically, more cross-transplants are possible. However, Yılmaz believes this would be very rarely, or never, necessary: **"Our operating room capacity is 12. If we exceed six-person transplants, we would have to use the operating room at the central facility, which is 10-15 minutes away. Unless absolutely necessary, six-person cross-transplants seems like the ideal maximum number."**

A source of pride.



Utku Ünver and Tayfun Sönmez.

We also reached Sönmez in Boston. Before the Banu Bedestenci Sönmez Liver Transplant System was implemented, approximately 250 liver transplants had been performed worldwide in the past 20 years, one using a triple cross-transplant and the rest using a double cross-transplant.

Sönmez said , **"Under the leadership of Prof. Dr. Yılmaz, Malatya's world leadership in this field, combined with my colleague Ünver's and my leadership in the field of economic design, has resulted in a system that we are very proud of."**

The system is expandable.

How much expansion potential does the system have?

Sönmez responded to this question as follows: **"With the resources of the İnönü University Liver Transplant Institute, up to six-way cross-transplants can be performed, and with the support of the rest of the hospital's units, up to seven-way cross-transplants can be done. However, the Banu Bedestenci Sönmez Liver Cross-Transplant System is based on the principle of achieving the greatest benefit with the smallest cross-transplants. Likewise, as the size of the cross-transplant increases, the logistical difficulty also increases. Therefore, six-way and five-way cross-transplants are rarely needed. And seven-way cross-transplants have never been necessary so far."**

According to Sönmez, before the system in Malatya, there were three leading centers in the world for cross-transplantation. These were the ASAN Health Center in South Korea, which pioneered liver cross-transplantation, Medanta Hospital in India, and Max Saket Hospital, also in India. All of these are private hospitals. ASAN Health Center performed a total of 52 transplants between 2002 and 2018, all of which were from bilateral cross-transplantation. This figure represents less than 1% of live-donor transplants.

Between 2009 and 2022, Medanta performed a total of 91 transplants, one of which was a triple cross-transplant and the rest were double cross-transplants.

Max Saket Hospital, on the other hand,

performed a total of 34 transplants between 2012 and 2021, all of which were double cross-transplants. This figure represents approximately 1.5 percent of all live-donor transplants at this hospital.