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BOTKIN HOSPITAL TRANSPLANT PROGRAM: 100 SOLID ORGAN TRANSPLANTATIONS

*A.V. Shabunin^{1, 2}, I.P. Parfenov¹, M.G. Minina², P.A. Drozdov², I.V. Nesterenko²,
D.A. Makeev², O.S. Zhuravel²*

¹ Russian Medical Academy of Postgraduate Education, Moscow, Russian Federation

² Botkin City Clinical Hospital, Moscow, Russian Federation

Objective: to evaluate the first results of the Botkin Hospital transplant program. **Materials and methods.** From June 2018 to October 2019, 100 solid organ transplants were performed at the Botkin City Clinical Hospital. Out of the 100 transplantations, 72 were kidney transplants (average age of recipients was 45.65 ± 11.35 years, HLA match averaged 2.09 ± 1.03) and 28 were liver transplants (average age of recipients was 50.14 ± 7.62 years, average MELD was 17.78 ± 3.28 (14–34)). **Results.** After transplantation, there was no 30-day mortality. Postoperative complications following kidney transplantation were established in 11 patients (15.2%). In 3 patients (4.3%) – suppuration of postoperative wound, in 2 patients (2.8%) – hematomas in the area of the postoperative suture during hemodialysis, in 5 patients (6.9%) – retroperitoneal lymphocele, in 1 patient (1.4%) – urosepsis. There were 4 cases (5.5%) of acute rejection, 3 cases (4.2%) of humoral rejection, and 1 case (1.3%) of cellular rejection. Early postoperative complications following liver transplantation were detected in 2 patients (7.2%). In one patient – hematoma under the right lobe of the liver on the 1st day after surgery, the diaphragm was the source of bleeding, in one patient – ascites leakage through postoperative sutures, which required relaparotomy. In 2 patients (7.2%), postoperative complications were found in the separated postoperative period. In one case, of choledochocholedochal anastomotic stricture – stricture stenting was performed with coated nitinol stent. In another case, acute adhesive intestinal obstruction, which required laparotomy, adhesiolysis. **Conclusion.** Implementation of the transplantation program in multidisciplinary hospitals can boost transplant care in a district and improve the treatment results of patients with terminal organ damage.

Keywords: kidney transplantation, liver transplantation, Botkin Hospital.

INTRODUCTION

Transplant care in Moscow has been a hot topic in modern medicine [1, 2]. As of December 31, 2018, 1529 people were on the waiting list for cadaveric kidney transplants in Moscow, while 208 people were in the liver waitlist [3]. Over half of patients awaiting transplantation are of working age. In Moscow, 10 billion roubles per year is spent on renal replacement therapy with hemodialysis. More than 3 billion roubles per year are spent on treatment of patients with incurable liver diseases [4]. This identifies the medical, financial and social problems of treating these patients [5].

The solution to these problems is to further develop transplant technology [6, 7]. So, over the past 4–5 years, the number of effective donors in Moscow has been steadily growing, donated organs have been increasing in number [3], thus increasing the number of transplant surgeries.

MATERIALS AND METHODS

Botkin City Clinical Hospital (Botkin Hospital) is Russia's largest multidisciplinary hospital with more

than 1800 beds. The hospital provides medical care in all areas of treatment. It has a full range of laboratory and instrumental diagnostics. Implementation of a transplant program at the hospital included three stages, which took place simultaneously throughout the year.

The first stage was about legal issues. The first step in this stage involved the inclusion (via Order No. 307n/4 of the Ministry of Health of the Russian Federation, dated June 4th, 2015) of Botkin Hospital in the registry of health care institutions engaged in harvesting, preparation, and transplantation of human organs and (or) tissues. Further, by Order No. 404n/1 of the Ministry of Health of the Russian Federation dated July 11th, 2017, Botkin Hospital was included in the registry of health care institutions of the constituent entities of the Russian Federation performing transplantation of human organs and (or) tissues. In the final step in this first stage, Botkin Hospital obtained Roszdravnadzor license (dated November 29, 2017) for medical activities on provision of specialized assistance in transplantation of organs and (or) tissues.

Corresponding author: Pavel Drozdov. Address: 15, Brusilova str., apt 8, Moscow, 117148, Russian Federation. Tel. (962) 985-04-41. E-mail: dc.drozdov@gmail.com

The second stage was a scientific one. It involved training of specialists from Botkin Hospital under the auspices of the Shumakov National Medical Research Center of Transplantology and Artificial Organs and the Sklifosovsky Research Institute of Emergency Care. In total, 26 employees were trained under the transplant program. Among them were 6 surgeons, 4 urologists, 1 gastroenterologist, 2 anesthetists, 5 resuscitators, 2 laboratory diagnostics doctors, 4 nephrologists, and 2 surgical nurses. Participants in the “Botkin Hospital Organ and Tissue Transplantation” program actively participated in liver and kidney transplantation surgeries at the Sklifosovsky Research Institute of Emergency Care and Shumakov National Medical Research Center of Transplantology and Artificial Organs. They also sharpened their skills in the cadaver-class pathology department of Botkin Hospital.

The third stage is the clinical one, which consisted of development of regulations for provision of high-tech medical care in kidney and liver transplantation. At this stage, waiting lists for cadaveric kidney and liver were formed.

KIDNEY TRANSPLANTATION

The first cadaveric kidney transplant at Botkin Hospital was performed on June 7, 2018. The patient had chronic glomerulonephritis. Over the 16 months that the Botkin Hospital Transplant Program existed, 72 kidney transplants were performed.

For all kidney donors, death was ascertained based on neurological criteria (brain death). Acute cerebrovascular accident (stroke) was the cause of death in 62.3% of donors. Mean age of donors was 46.44 ± 9.7 (22–65) years. In all donors, blood electrolyte values were within or slightly higher than normal (K^+ – 4.06 ± 0.64 (3–7.0) mmol/L, Na^+ – 142.14 ± 11.24 (127–165) mmol/l). Average creatinine level was 93.58 ± 27.69 (44–180) mmol/L, and urea – 6.06 ± 2.43 (2.0–10.9) mmol/L.

The mean age of recipients was 45.65 ± 11.35 (20–70) years. The HLA match averaged 2.09 ± 1.03 (1–5). However, it should be noted that all pairs had a match for at least one DR antigen. There were 5 (6.9%) pre-dialysis patients; 17 (23.6%) recipients also needed an emergency hemodialysis session before surgery.

Average cold ischemia time was 585.41 ± 191.93 (133–1188) min, average blood loss was 104.29 ± 52.54 (30–300) mL, average operation time was 250.72 ± 40.6 (160–370) min. A ureteral stent was installed in all kidney transplant cases. It was removed at the end of week 3 post-transplantation. Average bed day in ICU after kidney transplantation was 1.55 ± 0.85 (1–4) bed days. Total number of postoperative bed days following kidney transplantation was 17.08 ± 6.18 (12–33). Postoperative complications were observed in 11 patients (15.2%), postoperative wound suppuration in 3 patients (4.3%), hematomas in the site of postoperative suture during

hemodialysis in 2 patients (2.8%), retroperitoneal lymphocele in 5 patients (6.9%), urosepsis – in 1 patient (1.4%). There were 4 cases (5.5%) of acute rejection, 3 cases (4.2%) of humoral rejection, and 1 case (1.3%) of cellular rejection. There was no 30-day mortality. After kidney transplantation in all cases, a 4-component immunosuppressive regimen was used (monoclonal antibodies, glucocorticosteroids, calcineurin inhibitors, inosine monophosphate dehydrogenase inhibitors).

LIVER TRANSPLANTATION

The first cadaveric liver transplant took place on July 8, 2018. The patient had primary biliary cholangitis.

Over the 15 months that the Botkin Hospital Transplant Program existed, 28 liver transplants were performed.

Mean age of donors was 41.96 ± 10.46 (22–56) years. Average AST (57.97 ± 58.84 (7–208) IU/L) and ALT (42.85 ± 38.59 (5–184) IU/L) slightly exceeded the norm (40 IU/L). Average bilirubin level was within normal limits – $11.89 \pm 9, 14$ (3.7–43) IU/L.

Mean age of recipients was 50.14 ± 7.62 (34–66) years. Average MELD score was 17.78 ± 3.28 (14–34).

All liver transplants were performed using the standard piggyback technique. Choledochocholedochal anastomosis was formed in 25 cases, continuous absorbable monofilament thread 6-0 – in 3 cases. Average cold ischemia time was 396.82 ± 68.88 (290–590) min, and average warm ischemia time was 37.78 ± 8.88 (20–60) min. Average blood loss was 1322.22 ± 752.6 (200–3000) mL, average operation time was 531.1 ± 59.2 (430–720) min. Average bed day in ICU after liver transplantation was 3.04 ± 1.47 (1–8) bed days. Total number of postoperative bed days following liver transplantation was 16.33 ± 5.14 (11–37). There was no 30-day mortality. Early postoperative complications were observed in 2 patients (7.2%). In one patient, a hematoma under the right liver lobe was detected on day 1 after surgery. Diaphragm was the bleeding source. In one patient, ascites leaks through postoperative sutures was found. They required relaparotomy, drainage of the abdominal cavity. In 2 patients (7.2%), postoperative complications were revealed in the long-term postoperative period. In one case, choledochocholedochal anastomotic stricture – coated nitinol stent was used for the stricture. In another case, there was acute adhesive intestinal obstruction, requiring laparotomy, adhesiolysis. There were no histologically documented acute rejection reactions. There was no mortality. In liver transplantation for autoimmune diseases, a 4-component regimen was used ($n = 4$). A 3-component or 2-component regimen ($n = 24$) was used (monoclonal antibodies, calcineurin inhibitors, inosine monophosphate dehydrogenase inhibitors) for other conditions.

The third area of the Botkin Hospital Transplant Program was corneal transplantation. To date, ophthal-

mologists from Botkin Hospital have performed 160 operations at the hospital.

The fourth area of the program was autologous hematopoietic stem cell transplantation. The hematological clinic of Botkin Hospital performed 23 surgeries.

DISCUSSION

Increasing the availability of transplant care in the Russian Federation is an important medical, financial and social challenge. High-tech medical care via transplantation needs to be developed in leading regional medical institutions that have modern facilities and highly skilled medical personnel.

At the time the Transplant Program was launched, Botkin Hospital met all modern standards for transplant centers. The hospital has a nephrology center, a urology clinic, a liver & pancreas surgery department, a hepatology department, an anesthesiology and resuscitation center, an extracorporeal detoxification department, an ophthalmology clinic, and a hematology clinic. This made it possible for the hospital to – within a short time, with the involvement of its own staff, and with minimal financial costs – launch a transplantation program in four directions, and within 1 year and 4 months perform 100 solid organ transplantations with good immediate outcomes, which are comparable to the outcomes of other transplant centers.

CONCLUSION

Introduction of a transplant program in multidisciplinary hospitals would increase the volume of transplantological care in a particular region and improve treatment outcomes for patients with end organ damage.

The authors declare no conflict of interest.

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