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## KIDNEY TRANSPLANTATION USING KIDNEY TAKEN FROM A DEAD BODY. A CASE REPORT

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Twenty-one-year-old student of nursing school with chronic uremia, due to chronic glomerulonephritis was submitted to the transplantation of kidney, taken from a dead body. One month before the transplantation, bilateral nephrectomy with simultaneous splenectomy was performed. The total ischemic period lasted for 57 minutes only. The rejection crisis occurred on the 39th day after transplantation and was successfully controlled with increased dose of steroid hormones.

The function of the transplanted kidney was good. The patient gained 18 kg of weight, was normotensive, without anemia. There were still some symptoms of secondary hyperparathyroidism, due to the long lasting renal disease. The patient died six month after the operation because of hemorrhagic pancreatitis.

Kidney transplantation is becoming an ever widespreading procedure in patients dying of uremia due to chronic renal failure. Approximately 900 kidney transplantations have been performed in the whole world so far. A case of successful transplantation of the kidney taken from a dead body will be reported in this presentation.

#### CASE REPORT

Patient D. M., 21 years old nursing school student, was admitted to the Department I of Internal Disease Medical Academy in Warsaw, in May 1965 because of uremia due to chronic glomerulonephritis. Ten years before admission she had had scarlet fever complicated by nephritis. In September 1964 the patient started complaining of weakness and general lassitude, of being unable to concentrate, and of headaches and epistaxis. Polydipsia, polyuria and frequent micturition developed later on. On admission the patient was in a very bad general condition, dazed, starved, with a certain degree of edema in the lumbar region. Her heart was enlarged in all directions, the heart action was irregular with a loud systolic murmur. Blood pressure was 230/130 mm Hg. Basing on the

laboratory and clinical data the diagnosis of kidney cirrhosis due to chronic glomerulonephritis complicated by pyelonephritis was established. The patient was treated with intermittent dialyses (peritoneal and extracorporeal). Details of the course of the disease during the patient's stay in Department I of Internal Diseases have been presented in a separate paper (1).

On 13th of December 1965 in the Department I of Surgery the patient underwent bilateral nephrectomy and splenectomy as a preparatory procedure for kidney transplantation. The examination of the kidneys made in the Department of Pathological Anatomy, Medical Academy in Warsaw (Doc. Dr S. *Kruś*) revealed: "The weight of the left kidney 30 g., the right kidney 23 g. Histologically: most of the glomeruli were hyalinized, the remaining ones looked normal. This condition was accompanied by atrophy of the tubules. The intrarenal arteries showed a thickened multilayered intima". In the postoperative period infection developed in the wound. Following an injection a gluteal abscess formed with signs of general sepsis which was controlled by antibiotics. All the time the patient required two hemodialyses weekly to keep her alive.

On 26th of January 1966 kidney transplantation was performed. A 34 year old woman who had died of severe brain injury was the donor of the kidney. The latter was excised immediately after the death of the patient and perfused with cold Ringer's solution buffered to pH 7.4 with sodium bicarbonate. Simultaneously while one team was removing the kidney, the other started the operation on the recipient. The operation was performed under general anesthesia with Penthrane. Before the operation was started the recipient's right ureter was catheterized.

Using an oblique incision in the right iliac fossa the retroperitoneal space was approached and the dissection of the right hypogastric artery and the right external iliac vein was carried out. After the nephrectomy, the remaining stump of the right ureter was identified and isolated. The renal artery was anastomosed end-to-end, with the hypogastric artery and the renal vein, end-to-side, with the external iliac vein. The total ischemic time (from the death of the donor to the revascularization of the kidney in the recipient) was 57 minutes, and the time of warm ischemia (from the donor's death to the end of the perfusion of the kidney) 27 minutes. A few minutes after the revascularization, the kidney started to produce urine which was seen in the operative field during the urinary anastomosis. The ureter of the transplanted kidney was anastomosed with the patient's own ureter in a side-to-side fashion. To protect the anastomosis the catheter was left in the ureter as well as in the bladder.

The patient stood the operation very well. During the first four days after it the blood pressure, pulse and temperature were normal. Two days after the operation oral feeding was begun. Radioactive hippuran renography ( $^{131}\text{J}$  hippuran; Dr. *Kardasiewicz*) revealed normal vascularization of the transplanted

kidney (Fig. 1). From the day of the operation the patient was given 150 mg of prednisone and 3 mg/kg body weight of Imuran daily.

During the first 16 hours after the operation the kidney produced 730 ml of urine, and in the following days the urine output became stabilized on the level of two—three liters daily. On the first day a urinary fistula developed. Despite this function of the transplanted kidney was excellent and four days after the operation the blood urea and serum creatinine levels were normal (blood urea 24 mg%, serum creatinine 1.1 mg%).

The details of the postoperative course are shown in Fig. 2 and 3. On the fifth postoperative day hypertension appeared (BP 150/100—190/140 mm Hg) which was difficult to control with the use of several drugs. The patient's general condition gradually improved, she gained weight. By the time this paper was

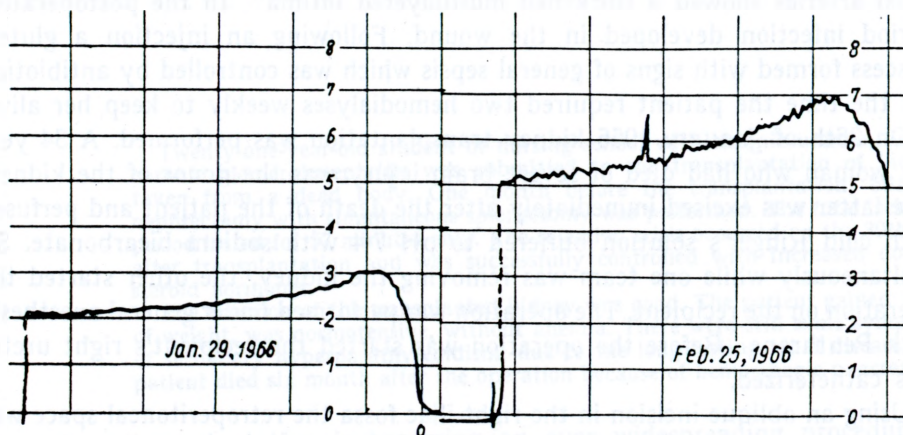


Fig. 1. Radioactive Hippuran ( $^{131}\text{J}$ ) renography of the transplanted kidney.

published she had gained 18 kg, anemia disappeared. The amount of urine coming through the fistula gradually decreased, and the fistula has now completely healed.

On the 39th day after transplantation the kidney function suddenly (over 12 hour period) worsened. Blood urea and serum creatinine increased from 70 to 170 mg% and from 0.7 to 1.7 mg% respectively. The urinary sodium concentration decreased to 13 mEq/l, urinary urea concentration increased to 1200 mg%, urine osmolality increased to 880 mOsm/kg  $\text{H}_2\text{O}$ . The threat of rejection was recognized and after ureteropyelography had excluded a mechanical obstruction the daily dose of prednisone was increased to 150 mg. Over a two-day period the kidney function improved and blood urea and serum creatinine levels as well as urinary sodium concentration returned to previously observed values.

At the time, when this paper was ready for publication, 107 days after the transplantation, the function of the kidney was good (blood urea 50—70 mg%, serum creatinine 0.7—1 mg%, GFR estimated with endogenous creatinine

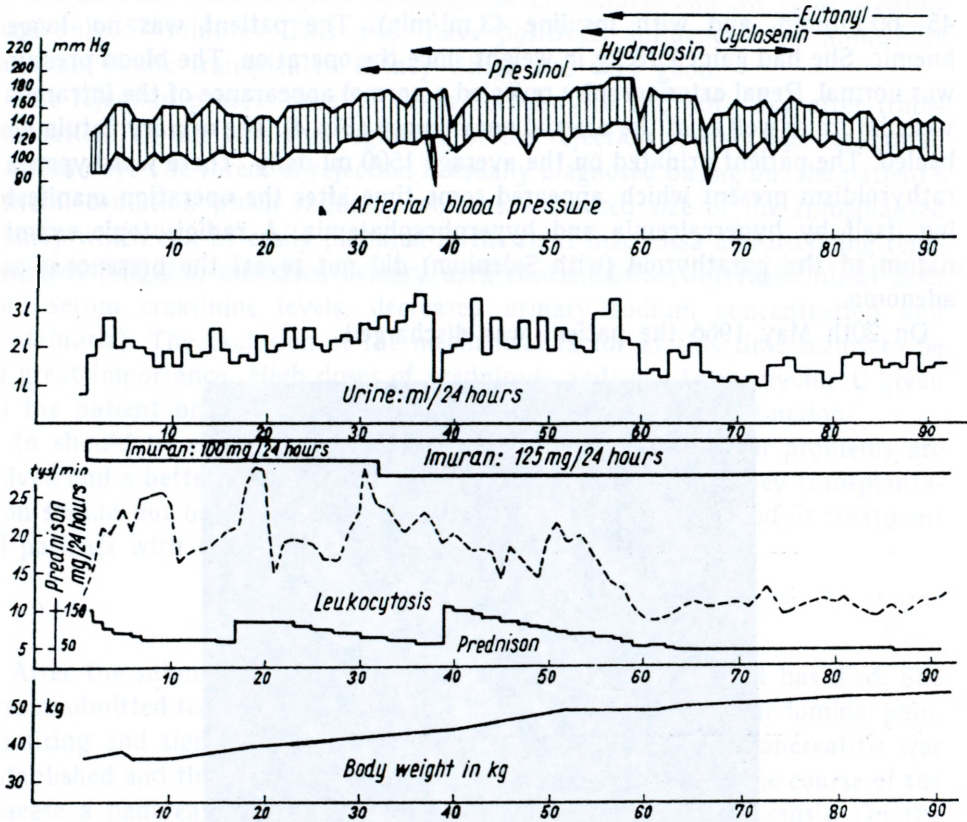


Fig. 2. Diagram showing important details in postoperative course.

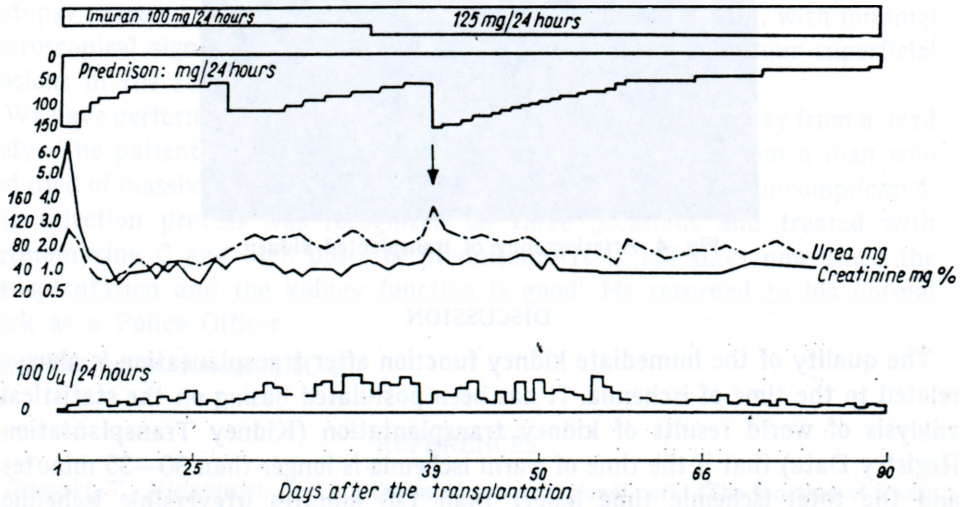


Fig. 3. Diagram showing important details of postoperative course.

45—60 ml/min, and with insuline 43 ml/min). The patient was no longer anemic. She had gained 18 kg in weight since the operation. The blood pressure was normal. Renal arteriography revealed a normal appearance of the intrarenal vasculature as well as of the arterial anastomosis (Fig. 4). The urinary fistula has healed. The patient urinated on the average 1500 ml daily. There was hyperparathyroidism present which appeared some time after the operation manifesting itself by hypercalcemia and hyperphosphatemia. A radioisotopic examination of the parathyroid (with Selenium) did not reveal the presence of an adenoma.

On 20th May 1966 the patient was discharged.



Fig. 4. Arteriography of transplanted kidney.

#### DISCUSSION

The quality of the immediate kidney function after transplantation is always related to the time of ischemia. It has been postulated basing on the statistical analysis of world results of kidney transplantation (Kidney Transplantation Registry Data) that if the time of warm ischemia is longer than 30—35 minutes and the total ischemic time longer than 120 minutes irreversible ischemic changes in the kidney will develop and the transplantation will be a failure.

In our case the time of warm ischemia was 27 minutes and the total ischemic time only 57 minutes. This must have positively influenced the immediate function of the transplanted kidney which was very good.

The rejection process usually occurs between 8th and 40th day after transplantation. In our case the beginning of the rejection process was recognized on 39th day. The threat of rejection is usually diagnosed basing on: the patient's general condition which suddenly worsens, increased size of the transplanted kidney which can be easily palpated in the right iliac fossa and declining renal function (oliguria, increased urinary urea concentration, increased blood urea and serum creatinine levels, decreased urinary sodium concentration and proteinuria). The exclusion of the mechanical factor at this time seems to be of great importance. High doses of prednisone and/ or, Actinomycine C given to the patient bring dramatical improvement in the kidney function.

It should be emphasized that until the basic immunological problems are solved and a better method of kidney preservation is found kidney transplantation should not be regarded as a well established clinical method of treatment of patients with chronic uremia.

#### ADDENDUM

After the submission of this paper for publication our patient has died. She was readmitted ten days after discharge because of severe upper abdominal pain, vomiting and signs of general shock. The diagnosis of acute pancreatitis was established and the patient was treated conservatively. During the course of the disease a pancreatic abscess formed with the signs of general sepsis. On the 25th July (six months after transplantation) the patient died of massive gastrointestinal haemorrhage. The kidney function during this whole time was good. Autopsy revealed the grossly normal looking transplanted kidney, with minimal microscopical signs of rejection, hemorrhagic pancreatitis and four superficial erosions in the stomach.

We have performed another kidney transplantation using a kidney from a dead body. The patient, a 40 years old man, received the kidney from a man who had died of massive cranial injury. The postoperative course was uncomplicated. The rejection process was recognized on three occasions and treated with Actinomycine C and high doses of prednisone. It is 157 days now since the transplantation and the kidney function is good. He returned to his normal work as a Police Officer.

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