Human Renal Homotransplantation in the Presence of Blood Group Incompatibilities.* (28399)

THOMAS E. STARZL,† THOMAS L. MARCHIORO AND WILLIAM R. WADDELL
(Introduced by R. J. Glaser)
Department of Surgery, University of Colorado School of Medicine, and Veterans Administration Hospital, Denver

Although red cell antigens are not thought to contribute to the homograft rejection process, there has been general insistence that human renal homografting should be restricted to those cases in which the major blood groups are identical in the donor and recipient patients(1-3). Inasmuch as the red cell antigens are widely distributed in human tissues, including the kidney(4), it has been feared that the mismatched graft would lead to either immediate or delayed red cell agglutination.

Recently, we have performed 3 renal transplants in the presence of donor-recipient major blood group incompatibilities. No undesirable sequelae were observed.

Methods. Two living and one cadaver donors were used (Table I). With the living donors, nephrectomy was performed under normothermia. The cadaver kidney was removed 75 minutes after death from a corpse which had been perfused and cooled to 15°C with a heart-lung apparatus, starting 5 minutes after death. The pump was primed with lactated Ringer's solution containing heparin and procaine. Immediately after removal, the kidneys were perfused through the renal artery with lactated Ringer's solution which had been cooled to 15°C. The infusing solution contained 50 mg heparin and 50 ml of 2% procaine chloride per liter. The perfusion pressure of 120 to 135 cm water (90 to 100 mm Hg) was adjusted by altering the height of the intravenous stand. After approximately 250 ml of solution had passed through the kidney, the effluent from the renal vein was clear. The kidney was then transplanted to the iliac fossa(3) of the recipient patient. During performance of the vascular anastomoses and restoration of renal blood flow, 40 g of mannitol were administered intravenously in 20% solution at the rate of 4 ml per minute.

Several measures were used to prevent rejection. All patients received daily azathioprine (Imuran, Burroughs Wellcome BW 57-322) and intermittent Actinomycin-C. Cases 1 and 2 received large doses of prednisone. Preliminary thymectomy and splenectomy were performed in Cases 1 and 2.

Results. In Cases 1 and 2, urine flow was observed within 8 minutes after revascularization. A brisk diuresis resulted in restoration of blood urea nitrogen to normal within a few days. Both patients had a period of threatened rejection, at 21 and 27 days, which was successfully reversed. The first patient still retains one of his diseased kidneys. The second patient had bilateral nephrectomy 2 weeks before the renal transplantation. At 9 and 5 weeks, both patients have normal renal function.

The patient who received a cadaver kidney (Case 3) still retains both his diseased kidneys. He was oliguric for 8 hours after transplantation, after which diuresis occurred at 1500-2000 ml per day. Blood urea nitrogen has fallen from 160 to 100 mg% in the 13 days since operation. His course has been complicated by sepsis at the transplantation site, necessitating wide drainage.

Discussion. Experience with these 3 cases has made it clear that identity of blood groups is not a prerequisite for successful renal transplantation. Previous reported failures with mismatched kidneys are probably explicable on other grounds.

Several adjuncts are probably useful under these circumstances. Washing the donor red cells out of the kidney by perfusion reduces the likelihood of acute hemagglutination within the kidney. The use of procaine in the perfusates is essential to prevent the

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† Markle Scholar.

TABLE I.

Case No.	Date of operation	Age & relationship of donor	Age of recipient	Donor blood group	Recipient blood group	Period of ischemia (min.)
1	1-30-63	Sister (32 yr)	38	B+	A+	28
2	2-25-63	Wife (30 ")	34	A+	AB+	36
3	3-21-63	Cadaver (32 ")	21	A+	O+	105

arteriolar constriction which prevents the inflow of fluid in most renal perfusion systems (5). Finally, the benefit of mannitol in the protection of such renal grafts cannot be proven on the basis of these experiences, but there is experimental evidence that it can prevent tubular damage after deliberate experimental introduction of blood pigments and by-products into the blood stream(6).

Summary. Three cases of clinical renal transplantation have been performed, using donor organs of different blood type than that in the recipient patient. Graft function occurred in all 3 cases, being most retarded in the kidney subjected to the longest ischemia. The kidneys provided by living donors have essentially normal function 9 and 5 weeks after transplantation.

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Antigens in Moldy Hay as the Cause of Farmer's Lung.* (28400)

MOSABURO KOBAYASHI,† MARK A. STAHMANN, JOHN RANKIN AND HELEN A. DICKIE
Departments of Biochemistry and Medicine, University of Wisconsin, Madison

Farmer's lung is a potentially serious and crippling occupational disease that is associated with the inhalation of dust from a variety of moldy plant materials, most frequently forage. The symptoms have been described as shortness of breath, cough, fever, chills, weight loss, and hemoptysis associated with an acute granulomatous interstitial pneumonitis(1). The physiopathological features of farmer's lung have been recently described by Rankin *et al.*(2). Although farmer's lung was first described by Campbell(3) over 30 years ago, the exact cause of this disease has not been clearly established. It has been suggested that it results from mechanical irritation or to fungal infection. Symptoms appear several hours after exposure to the dust and increase in severity upon repeated exposures. Dickie and Rankin(1) suggested that farmer's lung may arise from a hypersensitivity to molds or to the products of molds occurring in a wide variety of organic material.

In late 1960, we started experiments designed to detect specific precipitating antibodies against antigens from moldy forage in sera of patients with farmer's lung. Precipitins against antigens extracted with trichloroacetic acid from moldy hays from patients' farms were demonstrated in the sera of all farmer's lung patients who were acute-

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† Present address, Dept. of Pharmacology, Nihon University School of Medicine, Tokyo, Japan.