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RENAL TRANSPLANTATION ACROSS A BLOOD GROUP BARRIER — 'A₂' KIDNEYS TO 'O' RECIPIENTS

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Summary

The outcome of 11 renal transplants with kidneys from blood group A₂ donors to blood group O recipients is reported. Eight grafts had a satisfactory function, three early losses were noted: one acute rejection after four weeks, two technical failures. The longest survival is four years, the patient died from septicaemia with a functioning graft. Obviously, the blood group A₂-O incompatibility is not an obstacle to successful organ transplantation.

Introduction

There is a general agreement upon the necessity of ABO-compatibility between donor and recipient in organ transplantation as grafting across the ABO blood group barrier usually results in irreversible rejection within a few hours or days, with intravascular haemagglutination in small vessels due to reaction of blood group antibodies with the endothelium [1]. However, successful ABO incompatible grafts have been reported [2, 3].

Individuals belonging to blood group A₂ (subgroup of A) might constitute an exception to the rule as the A determinants on erythrocytes are few [4] and the red cells relatively insusceptible to isoagglutinins. Successful skin grafting on volunteers from A₂ donors to O recipients was reported in 1967 [5]. We therefore decided in 1974 to transplant A₂ cadaver kidneys to O recipients [6] and this study deals with the current outcome of this trial.

Material and methods

Between 1974 and May 1982, 11 cadaver grafts from seven blood group A₂ donors were transplanted into O recipients in our institution. Eight of the grafts were primary; three were secondary. The mean age of the recipients was 42.7 years (range 26-59), the cause of end-stage renal disease was glomerulonephritis

in four, diabetic glomerulosclerosis in three, pyelonephritis in two and in the last two patients, polycystic kidney disease and systemic lupus erythematosus, respectively. All recipients had received transfusions prior to transplantation. The mean number of HLA-A,B mismatches was 2.1 (range 1-3). No HLA-lymphocytotoxic antibodies were demonstrated. Standard immunosuppression was given, using steroids and azathioprine only. As antirejection therapy, bolus doses of methyl-prednisolone were given. All patients had isoagglutinins. The titres were determined on red blood cells belonging to subgroups A₁ and A₂ and expressed as serial dilutions on available serum samples. In the last four patients all samples were stored frozen and analysed simultaneously. The results were expressed as titres of anti-A₁ and anti-A₂.

Results

The outcome of the 11 transplants is shown in Figure 1. Eight grafts functioned satisfactorily, while three were lost in the early post-operative period: patient number 6 had an acute irreversible rejection after four weeks; patient number 1 had a normally functioning graft removed after 10 days due to gross haemorrhage caused by bacterial renal arteritis; graft number 4 never functioned and had an arterial thrombosis when removed after 18 days, the kidney being small, whitish and totally necrotic and no histopathological evaluation was possible.

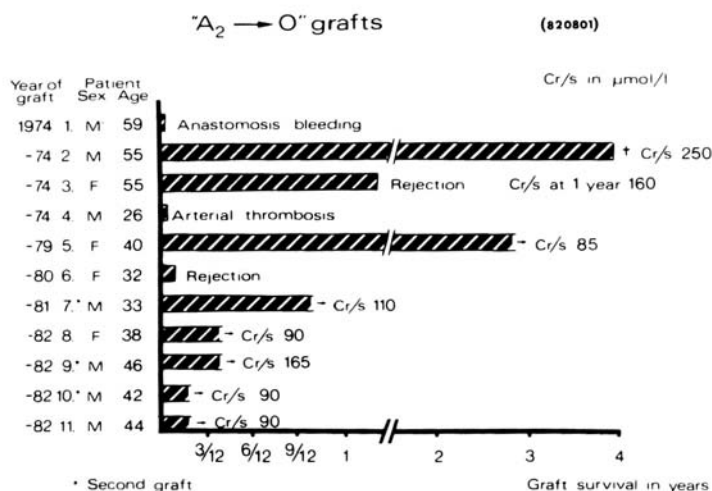


Figure 1. Individual course in 11 renal transplantation blood group A₂ grafts to O recipients

Of the eight primarily successful grafts, one was lost after 14 months due to rejection, having functioned satisfactorily until then (patient number 3). Patient number 2 died from septicaemia after almost four years of graft function.

The remaining six patients all have excellent or satisfactory renal function, one after almost three years, the last five after two to ten months.

Mild to moderate, in one case severe, acute early rejection episodes were noted in four patients, starting on day six to ten, and totally reversible after methyl-prednisolone treatment.

The isoagglutinin levels, anti-A₁ and anti-A₂ were measured in occasionally obtained samples in the first seven patients, no changes were seen. The last four patients received kidneys from two donors, one secretor and one non-secretor as determined by Lewis typing of erythrocytes. The two patients with grafts from the non-secretor donor displayed changes in isoagglutinin levels (Figure 2). The substantial increase in both anti-A₁ and anti-A₂ titres seen on day 10 coincides with a typical acute rejection crisis in both patients. The titre changes seen in the two recipients of grafts from the non-secretor donor were moderate and non-consistent. In these patients no signs of rejection were seen.

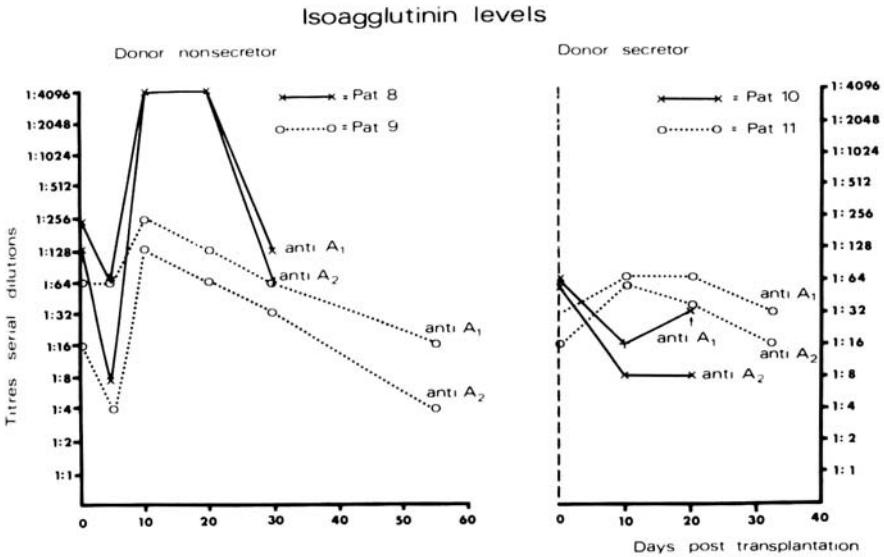


Figure 2. Isoagglutinin levels, anti-A₁, anti-A₂ in four individual cases, recipient blood group O, donor blood group A₂

Discussion

In this study of 11 transplants with kidneys from blood group A₂ donors to O recipients, there were no hyperacute rejections of the type to be expected when grafting across the ABO barrier. One graft had an early irreversible rejection and one graft was rejected after 14 months. The function of the surviving grafts is satisfactory and maintained with standard immunosuppressive drugs. The longest

graft survival, so far, is almost four years, the patient dying from septicaemia with adequate graft function.

Obviously, the blood group A₂-O incompatibility is not an obstacle to successful organ transplantation. This is in accordance with earlier reports on skin grafting [5].

Any possible negative influence on the long term results by this apparently 'minor' incompatibility will need longer observation times to appear.

Data on isoagglutinin titres of the recipients are yet scarce and cannot be the basis for conclusions. The finding of an increase in anti-A₁ and anti-A₂ titres in two recipients with grafts from a non-secretor donor, concomitant with acute rejection crises is interesting and deserves further investigation. It should be pointed out that after reversal of rejection the titres decreased to values similar to those obtained before grafting.

The number of individuals in Europe belonging to blood group A₂, is reported to vary between 15-25 per cent of the blood group A population [7]. As this proportion should be similar among potential kidney donors, transplantation of available A₂ kidneys to O recipients might to a certain degree alleviate the lack of organs for O recipients.

References

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Open Discussion

PERSIJN (Leiden) Do you treat rejection episodes in this group of patients with plasmapheresis?

BRYNGER No, we have used standard anti-rejection treatment, no plasmapheresis. They have behaved clinically in exactly the same way as other patients.

BARNES (Birmingham) Did I understand that the two long-term patients had been regrafted?

BRYNGER No, there have been two of the earlier failures regrafted successfully. The long term patients are alive with their initial A₂ graft.

BARNES The longest graft is how long?

BRYNGER Almost four years, when the patient died due to septicaemia.

VAN YPERSELE (Brussels) Have you considered preparing your recipients by the injection of substance A?

BRYNGER We have considered it but as yet we have not done so. This is an exciting new field and we will continue basic and clinical investigation.

Calculations show that the number of potential A₂ kidneys is approximately the same as O kidneys so this could be of quantitative importance.