Type II diabetes mellitus and chronic renal insufficiency: renal transplantation or haemodialysis treatment?

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Abstract. The proportion of type II diabetic patients requiring renal replacement therapy has increased over the last 15 years. The ideal treatment for these patients is still a matter of dispute. Diabetic patients with a history of myocardial infarction, stroke or peripheral gangrene prior to renal replacement therapy had a worse prognosis compared with patients without vascular complications even after renal transplantation. The main causes of death were myocardial infarction and sepsis. A history of severe vascular complications prior to renal replacement therapy is an independent factor of decreased survival in type II diabetic patients. Renal transplantation significantly improved survival of diabetic patients without vascular complications and should be considered as the treatment of choice in this group of patients.

Key words: renal transplantation; type 2 diabetes mellitus; survival; vascular complications; haemodialysis treatment

Introduction

In the last decade diabetic nephropathy has become an increasingly important cause of end-stage renal disease (ESRD) leading to renal replacement therapy [1]. Diabetic patients are being accepted for renal replacement therapy in increasing numbers and account for 25–30% of new patients requiring such treatment, especially in the USA and in Scandinavia [2,3]. However, the ideal therapy for type II diabetic patients with ESRD is still a matter of dispute. Only 10–15% of all type 2 diabetic patients received a renal allograft [4]. The aim of this review is to discuss the effect of renal transplantation or haemodialysis treatment on survival of type 2 diabetic patients with renal insufficiency.

Results

Survival data

The overall 1 and 5 year survival rates ranged from 58 and 14% respectively for all type 2 diabetic patients [5,6]. Survival was better in diabetic renal transplant recipients as compared with diabetic patients maintained on haemodialysis treatment (5 year survival: 59 versus 2%; \( P < 0.001 \)).

Factors related to survival

Patients managed by renal transplantation did far better \( (P < 0.0001) \), whereas the presence of severe vascular complications \( (P < 0.0003) \) and the duration of diabetes \( (P < 0.0061) \) influenced the prognosis of these patients adversely [5]

Mode of treatment

No influence of different modes of treatment was observed in patients presenting with vascular complications (1 year survival: haemodialysis 22% versus renal transplantation 38%). In patients without a history of vascular complications survival was dependent on the mode of treatment (1 year survival: haemodialysis 75%; renal transplantation 94%; 5 year survival: 16 versus 79%; \( P < 0.0001 \)).

One year survival of haemodialysed patients with and without vascular complications was significantly different (75 versus 22%; \( P < 0.005 \)).

Causes of death

Cardiovascular disease (myocardial infarction) and sepsis were the most common causes of death, accounting for 60% of deaths. Causes of death were similarly distributed in patients with and without a history of vascular complications (Tables 1 and 2). However, death occurred significantly earlier if vascular complications were present before haemodialysis treatment was started (5.6 ± 1.8 versus 18.5 ± 2 months; \( P < 0.01 \)).
Type 2 diabetes mellitus and chronic renal insufficiency

Table 1. Cause of death in haemodialysed patients with and without severe vascular complications (from Hirschl et al. [5])

<table>
<thead>
<tr>
<th>Variables</th>
<th>With SVC</th>
<th>Without SVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial infarction</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Stroke</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Sepsis</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

SVC, severe vascular complications.

Table 2. Cause of death in renal transplanted patients with and without severe vascular complications (from Hirschl et al. [5])

<table>
<thead>
<tr>
<th>Variables</th>
<th>With SVC</th>
<th>Without SVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial infarction</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Stroke</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sepsis</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

SVC, severe vascular complications.

Discussion

In the last decade, the number of diabetic patients with ESRD accepted for renal replacement therapy has increased continuously [5]. However, data concerning the prognosis of type II diabetic patients with chronic renal insufficiency are rare [6]. Nevertheless, type II diabetic patients are often not considered for renal transplantation. The prognosis of diabetic patients either maintained on haemodialysis treatment or transplanted is worse compared with the survival of non-diabetic patients with ESRD [7].

As demonstrated by Hirschl et al. [5], a history of severe vascular complications (myocardial infarction, stroke, peripheral vascular gangrene) is one of the most important adverse factors for the impaired survival of these patients. In contrast, type II diabetic patients without a history of severe vascular complications should be considered for renal transplantation, as survival of these patients improved markedly compared to patients maintained on chronic haemodialysis treatment.

As the existence of severe vascular complications reduces greatly the survival of type II diabetic patients, it seems necessary to establish preoperative diagnostic procedures, which allow identification of low- and high-risk patients prior to transplantation [8,9]. A screening programme should include evaluation of medical history, electrocardiogram, echocardiography, ergometry, 201-thallium-scintigraphy and sonography of the carotid arteries and the lower extremity arteries. If this screening programme gives evidence of ischaemic heart disease, percutaneous transluminal coronary angiography and balloon dilatation of the stenotic vessel has to be performed. Surgical intervention (aorto-coronary bypass graft) has been described as a potential alternative with acceptable mortality but increased morbidity [10].

In conclusion, renal transplantation is able to improve survival of type II diabetic patients with ESRD and without vascular complications. Thus, renal transplantation is the treatment of choice in this subset of patients.

References

1. Raine AEG. Epidemiology, development and treatment of end-stage renal failure in type 2 (non-insulin-dependent) diabetic patients in Europe. Diabetologia 1993; 36: 1099-1104