OPTIMUM DIALYSIS TREATMENT FOR PATIENTS OVER 60 YEARS WITH PRIMARY RENAL DISEASE. SURVIVAL DATA AND CLINICAL RESULTS FROM 242 PATIENTS TREATED EITHER BY HAEMODIALYSIS OR HAEMOFILTRATION

K Schaefer, G Asmus, *E Quellhorst, A Pauls, D von Herrath, J Jahnke

St Joseph-Krankenhaus I, Berlin, *Nephrologisches Zentrum Niedersachsen, Muenden, FRG

Summary

An analysis of the data of 180 haemodialysis patients and 62 haemofiltration patients over 60 years of age when commencing treatment, clearly shows that this age group of patients (when suffering from primary renal disease) has a very good chance of surviving many years when treated with either haemodialysis or haemofiltration. This refers also to patients being older than 75 or 80 years, who have survival rates of 50 per cent after five years and three years respectively. The presented data further indicate that chronic haemofiltration seems to be the superior treatment when compared with acetate haemodialysis for the treatment of elderly renal patients, as the survival rates are at any chosen time interval higher with haemofiltration than with haemodialysis.

Introduction

Only a few reports are available concerning treatment experiences with haemodialysis, haemofiltration, or chronic ambulatory peritoneal dialysis (CAPD) in patients older than 60 years [1–4].

The present report is an attempt to summarise our experiences with this age group. It is of note, that the majority of the elderly patients considered here has even surpassed the age of 70 years. In addition, we will compare the influence of two different treatment strategies (haemodialysis versus haemofiltration) on the survival rate of elderly patients and to analyse the causes for hospitalisation and mortality. Finally, data will be reported concerning the use of different therapeutic modes in these elderly patients compared to those used in patients younger than 60 years.

Patients and methods

Haemodialysis patients

Data are derived from a total of 180 haemodialysis patients, all being older than 60 years when starting haemodialysis (mean age 72.7 ± 5.8 years, female
patients n=111, mean age 72.0 ± 5.7 years, male patients n=69, mean age 73.9 ± 5.6 years). All the patients were treated in the haemodialysis facilities of the St Joseph Hospital (SJH) in Berlin since 1975. Only patients with primary renal diseases were included, i.e. patients suffering from diabetes mellitus, amyloidosis myeloma, immunological diseases or other systemic diseases were not considered. The records of the 180 patients were analysed for causes of hospitalisation, duration of the hospital admission, and, in the case of death, for the reason of mortality. Survival data were calculated according to Cutler and Ederer [5]. In addition data are reported of a recently conducted survey in five different German haemodialysis centres (Hann. Muenden, Heidelberg, Darmstadt, Muenchen, Berlin), which was initiated to evaluate the kind and frequency of drugs being prescribed to haemodialysis patients. In this context it seemed of special interest to compare the therapeutic regimen of patients under (n=453) and over (n=301) 60 years of age.

**Haemofiltration patients**

Data are reported from a total of 62 patients (mean age 73.8 years) who were treated either since 1972 in Hann. Muenden (n=45) or since 1976 in Berlin (n=17); (mean age: female patients 72.1 ± 5.7 years, male patients 74.9 ± 5.4 years). The same exclusion criteria for haemofiltration patients were applied as for haemodialysis.

The data analysis was performed accordingly, with the exception that no special inquiries concerning the medical therapy were performed in this patient group.

**Haemodialysis and haemofiltration techniques**

Haemodialysis was performed thrice weekly always using acetate as buffer. For seven years a sodium concentration of 150mEq/L was regularly applied. The duration of each haemodialysis session varied between four to six hours. Haemofiltration was always performed in the post-dilution mode. During a normal treatment session, undertaken thrice weekly, 20 to 35 litres were exchanged, the volume of exchange depending mainly upon the general feeling of the patients, their blood urea nitrogen and the fluid, which had to be removed during one session, respectively. The dialysers and haemofilters, which were used differed according to the market situation. This also applied to the haemofiltration equipment which was changed according to the technical progress achieved in the last years in this field.

**Results**

**Haemodialysis**

Table I depicts the different diseases which caused the end-stage renal failure in the elderly patients. The most frequent cause was chronic glomerulonephritis, which was in most cases diagnosed from clinical criteria, i.e. the absence of a
### TABLE I. Renal diseases of haemodialysis/haemofiltration patients being older than 60 years (SJK, Berlin)

<table>
<thead>
<tr>
<th>Renal Disease</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glomerulonephritis</td>
<td>38.8%</td>
</tr>
<tr>
<td>Interstitial nephritis</td>
<td>29.8%</td>
</tr>
<tr>
<td>Nephrosclerosis</td>
<td>8.5%</td>
</tr>
<tr>
<td>Cystic kidney disease</td>
<td>8.0%</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>1.6%</td>
</tr>
<tr>
<td>Nephrolithiasis</td>
<td>0.5%</td>
</tr>
<tr>
<td>Unknown</td>
<td>12.8%</td>
</tr>
</tbody>
</table>

Special history indicating another disease, or the presence of hypertension, haematuria and proteinuria. Most of the cases of interstitial nephritis were associated with an abuse of analgesics and could therefore presumably be classified as analgesic nephropathies.

### TABLE II. Overview about diseases which were frequently the cause for hospital admission (SJK, Berlin)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number of Admissions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shunt problems</td>
<td>158 admissions</td>
<td>24.5%</td>
</tr>
<tr>
<td>2. Cardiovascular diseases</td>
<td>103 admissions</td>
<td>15.6%</td>
</tr>
<tr>
<td>3. Gastrointestinal diseases</td>
<td>94 admissions</td>
<td>14.6%</td>
</tr>
<tr>
<td>4. Sepsis</td>
<td>40 admissions</td>
<td>6.2%</td>
</tr>
<tr>
<td>5. Overhydration</td>
<td>32 admissions</td>
<td>5.0%</td>
</tr>
<tr>
<td>6. Hypertensive episodes</td>
<td>26 admissions</td>
<td>4.0%</td>
</tr>
<tr>
<td>7. Miscellaneous (n=47)</td>
<td>193 admissions</td>
<td>31.1%</td>
</tr>
</tbody>
</table>

53 different diseases, 646 admissions, 100%

Table II shows the diseases which were mainly responsible for hospitalisation. It can be seen that shunt problems and cardiovascular and gastrointestinal (mainly bleeding) disorders were the most frequent reasons for admission. However, it is of note that the duration of the hospital stay was especially long when it was due to sepsis, whereas the other complications resulted in comparable lengths of hospital stay (Table III). The average time of a hospital stay for haemodialysis patients older than 60 years was 2.4 days per month.

### TABLE III. Duration of hospital stay for diseases which most frequently caused hospital admission (SJK, Berlin)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sepsis</td>
<td>41.0 days</td>
</tr>
<tr>
<td>2. Shunt problems</td>
<td>17.7 days</td>
</tr>
<tr>
<td>3. Cardiovascular diseases</td>
<td>15.1 days</td>
</tr>
<tr>
<td>4. Gastrointestinal diseases</td>
<td>15.1 days</td>
</tr>
<tr>
<td>5. Hypertensive episodes</td>
<td>13.6 days</td>
</tr>
<tr>
<td>6. Overhydration</td>
<td>11.9 days</td>
</tr>
</tbody>
</table>
TABLE IV. Causes of death in 72 haemodialysis/haemofiltration patients being older than 60 years (SJJK, Berlin)

1. Cardiovascular diseases 27.8%
2. Cerebrovascular diseases 11.1%
3. Sepsis 9.7%
4. Gastrointestinal bleeding 8.3%
5. Hyperkalaemia 6.9%
6. Chronic obstructive lung disease 5.6%
7. Malignancy 2.8%
8. Liver coma 2.8%
9. Peritonitis 2.8%
10. Suicide 2.8%
11. Hypertension, uraemia, hepatitis, undernutrition, leukaemia, pulmonary embolism 1.4%
12. Unknown 11.0%

Table IV shows the causes of death in 72 haemodialysis/haemofiltration patients who died in the St Joseph Krankenhaus since 1975. Vascular disorders localised either in the heart or cerebrum were the cause of death in almost 40 per cent in elderly renal patients. Almost 10 per cent of this age group died because of sepsis or gastrointestinal bleeding. In almost all cases the listed diagnoses are based on findings obtained at autopsy.

Figure 1 shows the seven year survival rate of 180 haemodialysis patients and 62 haemofiltration patients. It is evident that at all time intervals patients being treated by haemodialysis have a lower survival rate than haemofiltration patients. The difference is especially pronounced after the fourth year.
Figure 2. Survival rates of haemodialysis and haemofiltration patients being older than 70 years

A similar gap between both treatment methods could be demonstrated when the survival rate was calculated only for patients being older than 70 years when they started receiving regular haemodialysis (Figure 2).

Figure 3 shows the survival rates for three different age groups. It is remarkable, that after five years no difference could be demonstrated for patients being 70 years or 75 years when commencing haemodialysis. Even patients being older than 80 years at the start of regular haemodialysis have an almost 50 per cent chance of surviving for three years.

Table V summarises the 12 therapeutic agents which were most frequently prescribed in elderly haemodialysis patients. Major differences with regard to the patients being younger than 60 years refer especially to the prescription

Figure 3. Survival rates of haemodialysis patients commencing haemodialysis at the age of 70, 75 or 80 years, respectively
TABLE V. Frequency of use of individual therapeutic agents in patients being younger (n=453) and older (n=301) than 60 years (% of all patients)

<table>
<thead>
<tr>
<th>Drug</th>
<th>&lt;69 years</th>
<th>&gt;60 years</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Phosphorus binder</td>
<td>96.5</td>
<td>90.7</td>
<td>- 5.8</td>
</tr>
<tr>
<td>2. Vitamin preparations</td>
<td>77.7</td>
<td>75.1</td>
<td>- 2.6</td>
</tr>
<tr>
<td>3. Antihypertensive agents</td>
<td>48.3</td>
<td>52.2</td>
<td>+ 3.9</td>
</tr>
<tr>
<td>4. Digoxin/Digitoxin</td>
<td>32.2</td>
<td>61.1</td>
<td>+ 28.8 (!)</td>
</tr>
<tr>
<td>5. Iron preparations</td>
<td>30.5</td>
<td>18.6</td>
<td>- 11.9</td>
</tr>
<tr>
<td>6. Vitamin D preparations</td>
<td>30.0</td>
<td>16.3</td>
<td>- 13.7</td>
</tr>
<tr>
<td>7. Sedatives/Hypnotics</td>
<td>14.3</td>
<td>14.3</td>
<td>0</td>
</tr>
<tr>
<td>8. Calcium salts</td>
<td>13.9</td>
<td>8.6</td>
<td>- 5.3</td>
</tr>
<tr>
<td>9. Antiplatelet agents</td>
<td>13.7</td>
<td>23.3</td>
<td>+ 9.6</td>
</tr>
<tr>
<td>10. Laxatives</td>
<td>9.7</td>
<td>12.0</td>
<td>+ 2.3</td>
</tr>
<tr>
<td>11. Nitrates</td>
<td>9.1</td>
<td>30.2</td>
<td>+ 21.1 (!)</td>
</tr>
<tr>
<td>12. Analgesics</td>
<td>8.4</td>
<td>17.6</td>
<td>+ 9.2</td>
</tr>
</tbody>
</table>

of digoxin/digitoxin, which was substantially increased in the elderly group. This is also true for nitrates which also increase by more than 20 per cent.

The actual number of drugs which is prescribed does not differ between the two age groups (Figure 4). Most of the patients being either younger or older than 60 years are taking five different therapeutic agents daily. There are also no differences demonstrable for patients of each group taking either more or fewer drugs per day (Figure 4).

![Figure 4. Number of different therapeutic agents prescribed to haemodialysis patients being younger or older than 60 years](image)

**Haemofiltration**

The diseases which most frequently caused hospitalisation in haemofiltration patients (Hann. Muenden) were myocardial insufficiency, myocardial infarction
and shunt problems. The average duration of the hospital stay was slightly shorter than for haemodialysis patients, although it is difficult to establish any significant differences, as the haemodialysis patients from the St Joseph Krankenhaus were compared with the haemofiltration patients from the Hann. Muenden hospital.

The causes of death of the haemofiltration patients treated in Hann. Muenden were comparable to haemodialysis patients. In haemofiltration patients, too, vascular complications of the heart and cerebrum were the leading reasons for mortality.

The survival rates for haemofiltration patients compared to haemodialysis patients are, as already indicated, depicted in Figures 1 and 2.

Discussion

The results presented show very convincingly that it is extremely rewarding to treat elderly patients with haemodialysis or haemofiltration, especially when they are suffering from a primary renal disease. When comparing our data obtained in haemodialysis patients with those of the EDTA Registry it becomes evident that the St Joseph Krankenhaus haemodialysis patients with an age over 60 years have a better chance of surviving five years than patients of a comparable age group reported in the EDTA Registry, who are subjected either to haemodialysis, peritoneal dialysis or transplantation, respectively [6]. Even our patients being older than 75 years when commencing haemodialysis, have a significantly better five-year survival chance than the age group ranging from 55 years to 64 years as reported by the EDTA Registry [6]. Furthermore, it is of importance to realise that even patients older than 80 years at the start of haemodialysis have an almost 50 per cent chance of surviving three years. The most striking and relevant finding, however, appears to be the fact that elderly patients have a better chance of surviving many years when treated by haemofiltration rather than by acetate haemodialysis. This conclusion is not only true when comparing the haemofiltration patients of Hann. Muenden and Berlin with the haemodialysis patients of the St Joseph Krankenhaus, but also when comparing the survival rates of the haemofiltration patients and the haemodialysis patients in only one centre (Hann. Muenden).

Of further interest is the fact that elderly haemodialysis patients, as compared to the younger age group, show no difference with regard to the number of therapeutic agents which are prescribed for them. It is, however, not surprising that digitalis preparations and nitrates are more frequently used in elderly haemodialysis patients.

Survival of elderly patients with chronic renal failure was documented in the recent past by different groups. Taube et al reported data from the United Kingdom, which showed that patients with an age range from 55 to 72 years could be successfully treated by renal replacement therapy. The five-year survival was a little higher than in our haemodialysis patients; however, the mean age was only 59.6 years, and therefore lower by 13.1 years [2]. Of interest in this context are the findings by Chester et al [1] who reported on 45 patients starting haemodialysis after the age of 70 years (mean 75 years). The three-year
survival of their patients was 23 per cent, which is markedly lower than in our elderly haemodialysis patients with a starting age of 70 years, who show a three-year survival of 65 per cent. Nine of their elderly patients were over 80 years old and had a similar two-year survival as compared to our patients over 80 years (41% versus 47%). However, none of their patients survived more than three years, a finding which is significantly different from our data. In 1984 Westlie et al reported a five-year survival of 22 per cent in their patients being older than 70 years, which again is lower than in our patients [4]. More recently Mallinson et al reported that elderly patients requiring haemodialysis had a significantly poorer survival than non-dialysed patients [3]. However, when comparing the actuarial survival rate of the non-dialysed patients with our dialysed patients it is evident that only less than 35 per cent of their patients have survived four years, whereas 60 per cent of our haemodialysis patients are still alive after that time interval. The superiority of haemofiltration, especially when treating elderly patients or so-called poor-risk patients, is well documented [7]. According to our knowledge, the data reported above permit for the first time a direct comparison between haemodialysis and haemofiltration on a large scale. The reasons for the superiority of haemofiltration for elderly patients cannot be discussed in this context, especially as it is presently not clear whether differences in the solute transport (convection versus diffusion), membrane properties or other factors are of major importance, for the difference between these two blood purification treatments.

In conclusion, data obtained in 242 patients older than 60 years at the start of replacement therapy clearly demonstrate that it is very rewarding to start treatment in this age group. Good survival rates could also be documented for patients older than 75 years. According to the experiences of two large haemodialysis centres it appears that post-dilution haemofiltration seems to be a better method than acetate haemodialysis. However, it remains to be seen whether or not CAPD could compete with both methods.

Acknowledgments

We thank D Kutschera, D Weisselberg and S Schaefer for their help in compiling and typing the data.

References

1 Chester AC, Rakowski TA, Argy WP et al. Arch Int Med 1979; 139: 1001
5 Cutler SJ, Ederer F. J Chron Dis 1958; 8: 699
7 Quellhorst E, Schuenemann B, Hildebrand U. Blood Purif 1983; 1: 70
Open Discussion

KLINKMANN (Chairman) I was looking forward in the presentations to an answer to a question, but probably the question was too difficult because almost no speaker touched on it. How do the elderly patients compare to any other chronic disease social-wise, economic-wise, as well as from the medical survival rates. You all compared and showed younger patients, but none of you have, for example, compared data from chronic patients with carcinoma, cardiovascular disease and so on. I do not know if any of you are prepared to answer the question, but I would like, as a start to the discussion, to have a statement from all of you.

MION Your question is very difficult to answer because we do not have the experience. However, I would say that those we call ‘retired active’ who are 60 per cent of the haemodialysis population and 50 per cent of the intermittent peritoneal dialysis population, do as well, if not better, than any other chronic disease.

KLINKMANN But there is no hard data available at present from your Centre? Dr Schaefer, do you have any such data on patients treated by haemofiltration?

SCHAEFER I am sorry that I also have no data on that, but I know that Dr Jacobs will present some examples of different diseases.

JACOBS Well, I anticipated that this question would come up, so I enquired from one of my colleagues. We looked at the reports of cancer patients from the National Institute of Health in the United States issued in 1976 and reprinted in 1981. In male patients in the 55–74 year age range, the age range which was considered in our presentations, for five very common cancers. The five-year survival in patients with carcinoma of the prostate in the 55–64 year age range was 67 per cent, and in the 65–74 year age range 45 per cent; bladder carcinoma is exactly the same, but for cancer of the stomach, bronchus and lung the five year survival is less than 10 per cent. In females the five-year survival in the 55–64 year age range is 60 per cent for carcinoma of the breast and 55 per cent in the 65–74 year age range; cancer of the cervix uterus is 48 per cent at five years in those aged 55–64 and only 37 per cent in the 65–74 year age range. I do not want to get you baffled with all these figures: the only conclusion that can be drawn is that the results which are obtained in patients with life-threatening diseases like end-stage renal failure, which kills people within a five day interval if not treated, compares very favourably indeed with the results of many malignant tumours whose treatment is not really disputed or criticised strongly in the developed countries.

KLINKMANN Thank you Dr Jacobs: we might come back to this during the discussion.
IAINA (Israel) Do you think that the elderly patient needs less or more hours of dialysis each week and do you have any data on the deterioration of residual kidney function during dialysis in these patients?

MIÖN I have no information on the residual renal function, although I know some patients maintain kidney function: they need as much dialysis as younger people, if you take into account their body size and residual kidney function.

SCHAEFER I have no data on residual renal function and the duration of haemodialysis as compared to the younger patients. In our patients it ranges between four to six hours per session.

JACOBS I have no data on the evolution of renal function. In the retrospective study, the clinical and biological results that I have shown were obtained with a duration of dialysis sessions of approximately the same time.

KLINKMANN Clearly this is a matter to be examined at future congresses.

BERNHEIM (Israel) I want to give my experience because over 60 per cent of my patients are older than 60 and 25 to 30 per cent of my patients are over 70. It is very difficult to compare the results between haemodialysis and peritoneal dialysis because in patients aged 65 years and 75 years without dialysis have a different life expectancy. In our patients there is no difference between haemodialysis and peritoneal dialysis. I do not think that you can make a comparison between peritoneal dialysis and haemodialysis because the same patient is on either haemodialysis or peritoneal dialysis. I do not think there is a particularly good treatment as I think that all the treatments are good for these patients.

KLINKMANN So you do not believe that we need any specific mode of treatment?

MIÖN I would agree generally with that statement, except in our experience in the age groups 60–64, 65–69 and 70 plus, haemodialysis always gives better results than peritoneal dialysis. However, we have a negative bias selection because the worst patients are put on peritoneal dialysis. Therefore it is very difficult to compare patient groups and so I agree with you completely.

BERNHEIM Exactly, that is the problem because you are taking the bad patients onto peritoneal dialysis.

KLINKMANN Well, it should not be that way and I do not think it can be stated generally.

ANDREUCCI (Naples) First of all let me congratulate you for your excellent presentations. It is very exciting to hear that we are so good in giving a good life to older patients. Professor Mion, you are one of the most expert in CAPD,
what is your present policy in deciding which kind of treatment to give these older patients? I would like to ask the same question of Professor Schaefer. Could Professor Jacobs tell us of the incidence of side effects, such as hypotension, during or after haemodialysis in these older patients? Finally, what was the cost of haemofiltration?

MION I presented the original experience from several centres. In Montpellier we try to take all patients over 65 on peritoneal dialysis and let them try both intermittent peritoneal dialysis and continuous ambulatory peritoneal dialysis and then select what is most convenient. The trend is that the older patients, who are usually more dependent upon their spouses or helpers, will have home intermittent peritoneal dialysis, whereas those who are fitter and more independent will have CAPD because they can do that themselves. In the age group 60–65 there is more versatility and if the patient is fitter we will treat by haemodialysis. Some of them will prefer peritoneal dialysis because they do not tolerate haemodialysis. There are some other centres like Perpignan, for instance, or Carcassone where there is a trend to take more patients into hospital haemodialysis whatever the age group.

SCHAEFER I would presently consider haemofiltration as a superior method for elderly patients when comparing survival rates. However, what is necessary for these patients is that they have very good vascular access. It could well be that patients who have poor vascular access are also the patients who have a poor survival rate after transfer to haemodialysis. However, I would like to emphasise that it is very rewarding to treat these elderly patients with haemodialysis. Therefore I would start patients with good vascular access on haemofiltration and if they have poor vascular access I would transfer them to haemodialysis. As far as costs are concerned I think there is presently no doubt that haemofiltration is much more expensive than haemodialysis, but as you may know there are some advances in reducing the costs of the substitution fluid.

JACOBS I would like to answer the question about the side effects during dialysis sessions in elderly patients. There are three main side effects: hypotensive episodes, angina and arrhythmias. If you want to compare the incidence and the severity of the side effects you have to compare similar groups of patients under and over 60 years with, for instance, bicarbonate dialysate or ultrafiltration controls and so forth. Secondly, you must compare the groups with respect to haematocrit and hypotensive medications and so on. It is very difficult to give an overall figure that is meaningful about the relative proportions of side effects in younger and elderly patients if you have not very homogenous groups.

KERR (London) I was surprised to hear from Professor Jacobs that osteodystrophy is as common in the elderly as in the young, which is contrary to a lot of previous experience. I wonder whether osteoarthritis in the elderly is being misinterpreted as osteodystrophy or whether this is confirmed radiologically or by histology?
JACOBS The question on the form regards the clinical manifestations of renal osteodystrophy, which may mimic the manifestations due to arthrosis from ageing of joints and bones. This item must be subject to careful interpretation. I do agree with you.

PORT (Michigan) Could the panel please comment on the withdrawal from therapy as a cause of death. Is this a significant proportion that is hidden in causes of death, such as cerebrovascular accident or other cardiovascular causes? Secondly, are patients allowed to withdraw from therapy in this elderly age group when they have major complications?

MIION Withdrawal represented about two per cent of deaths on haemodialysis and about 8–10 per cent on peritoneal dialysis. The patients were allowed to withdraw if the family decided they should not continue the treatment when the complications are particularly severe, such as cerebrovascular accident.

SCHAEFER In my experience it is about two per cent and I have listed it as suicide.

JACOBS In a large series of patients suicide and abandonment of treatment have been combined and represented about three per cent of all deaths.

KLINKMANN Is the suicide rate in these patients higher than in the general population?

JACOBS I cannot answer that question.

BARTOVA (Prague) Dr Jacobs mentioned that patients were taking anticoagulant drugs and I wondered if it was for ischaemic or cardiovascular disease or for fistula problems?

JACOBS It was not specified on the questionnaire so I cannot answer that question.

BARTOVA Professor Schaefer, is the hyperkalaemia the cause of death, the result of clinical complications, such as the catabolic state of the patient or gastrointestinal bleeding? If it was just a high potassium intake in the diet you can take it as a mode of suicide.

SCHAEFER Yes, it depends on whether it was done on purpose.

SHALDON (Montpellier) This is a comment and a question. I do not accept that there are no differences between these forms of treatment. We should be concerned that our methodology of retrospective analysis is being analysed perhaps less sensitively than it should be. A consequence of this is that in the small numbers of patients the actuarial survival rates are probably not the appropriate way to determine survival. The second point which I would like
the panel’s opinion on is that perhaps our picture in Europe is too rosy for the real geriatric picture, in that already from 1982–1983 the mortality rate versus the new intake rate has shown a considerable increase of 52 per cent from 42 per cent in one year. Do you really think that your survival rates in your elderly patients is merely reflecting the use of geriatric dialysis and that you are really just showing a positive selection process?

JACOBS Well, I think it is always a problem in showing the results from one Unit or two Units where they have their own selection criteria as compared to very large series where the selection criteria may cancel out. One particular experience is valid for one group and it is probably not a general view for every case. If you have a very large series you may also restrict the validity of the results due to the fact that you have a mixture, so there is no totally satisfactory answer to your question.

MION I fully agree on the limitations of retrospective analysis. It is very difficult to get hard data and to show up comparative results. My feeling is that peritoneal dialysis is inferior to haemodialysis but I cannot prove it because it is not randomised and prospective.

RITZ (Heidelberg) We have heard very sophisticated and detailed analysis, but I would appreciate to point a question directly to Professors Mion and Schaefer. God be gracious to you, but if you were aged 70 or 80 what kind of treatment would you prefer for yourself?

MION That is a very important question which I have asked myself when I am doing this kind of prospective study. Firstly, I wonder whether beyond a certain age, such as 70 or 80, I would like to have a life of peritoneal dialysis or whether I would prefer to die. I cannot tell you because the courage to die is not given to everyone. If I had to choose I would first like to try some kind of haemodialysis or haemofiltration before going to peritoneal dialysis.

SCHAEFER I think the answer would depend on my vascular status. I think it would be fair to put to the golden-standard Claude Jacobs the same question.

JACOBS Well, I think it is one of the most difficult questions that can be asked because it relates to the quality of life that one wishes to have for his or her last years of life. As somebody put in the literature very clearly, the quality of life of an individual is actually what the individual thinks it to be and so this is a very personal question. On the one hand, centre haemodialysis treatment is very well appreciated by elderly patients because they have created another family; this is particularly true for patients who are single because the husband or wife has died. On the other hand, at the other extreme, retired people with nothing much to do and having CAPD at home have found another profession. They are CAPD people. This is to show that each individual is different and what is excellent for one is very bad for the other. I think that there is no general way of dealing with this topic.
ROTELLAR (Barcelona) Have you compared people over 60 years in the general population with patients over 60 on dialysis with respect to the mortality rate?

JACOBS I would not like to answer this question because I have not examined this.