

RENAL FAILURE AND THE REQUIREMENTS FOR MAINTENANCE HAEMODIALYSIS IN MALTA

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In order to estimate the demands for prolonged management of chronic failure by maintenance haemodialysis, one has to consider the number of patients in the community who are likely to benefit from such treatment. Malta, with its small size and a stable population of just under 300,000, is eminently suited for a survey of the incidence of disease in a community. The purpose of the present study is to find the incidence of renal failure in Malta as well as to assess the number of patients who would be suitable for treatment by long term haemodialysis. St. Luke's Hospital is the only general hospital in Malta and uraemic patients are at one time or other during their illness investigated in this hospital. For the purpose of this study renal failure was defined as a blood urea value of 100 mg per 100 ml or more (Branch *et al.*, 1971). All patients, who during some stage of their stay in hospital had a blood urea level of 100 mg per 100 ml or more were studied.

Methods

Data were collected in three ways:

1. *Laboratory Records:* A list of patients with blood urea values of 100 mg per 100 ml or more detected during 1968 was compiled from the biochemistry laboratory records.
2. *Clinical Notes:* As potential candidates for treatment by haemodialysis would probably have been admitted to the medical divisions, the case histories of outpatients and inpatients in these di-

visions were reviewed in order to trace uraemic patients who could have possibly been omitted from the biochemistry laboratory records list.

3. *Death Certificates:* The death certificates of patients dying in hospital in 1968 were reviewed and a list was made of the certificates in which uraemia figured as a cause of death.

TABLE 1

Age in Years	No. of Patients			% of total
	Male	Female	Total	
0 - 9	4	3	7	4.3
10 - 19	1	2	3	1.8
20 - 29	1	2	3	1.8
30 - 39	3	2	5	3.1
40 - 49	10	7	17	10.4
50 - 59	14	9	23	14.1
60 - 69	10	27	37	22.7
70 - 79	27	22	49	30.0
80 -	14	5	19	11.8

Age and Sex Distribution of 163 Patients with Blood Urea of 100mg/100ml or more.

Results

The biochemistry laboratory records at St. Luke's Hospital showed that 185 patients had a blood urea value of 100 mg per 100 ml or more during some stage of their stay in hospital. We were unable to trace the case notes of 35 (19%) of these patients, but none of these were below the age of 60, and only 5 between 60 and 70 years. Six patients were traced on reviewing all the case notes in the medical division and 7 hitherto undetected uraemic patients were traced back from their death certificates. The total number of cases available for study was therefore 163. An attempt was made to determine the predominant cause of uraemia in each instance.

Analysis of the age and sex distribution of patients with uraemia shows a preponderance of elderly patients (Table 1). Seventy-eight per cent of patients were over 50 years and 42% were over 70 years. Eleven per cent were, however, under 40. There was no substantial sex difference, though there was a predominance of female patients in the 60-69 age group, and a predominance of male patients in the over-eighty age group.

TABLE 2

SPECIALITY	No. of Admissions	% of Total
General Surgery	3473	28.6
General Medicine	1789	14.8
Maternity	2073	17.1
Gynaecology	951	7.0
Orthopaedics	1386	11.4
Paediatrics	979	8.1
Otolaryngology	1119	9.9
Ophthalmic	366	3.1
	12,136	100.0

Total Number of Admissions during 1969

The number of patients admitted under the various specialities is shown in Table 2. General Surgery and Medicine accounted for 43% of all hospital admissions, but for 86% of the patients with the elevated blood urea (Table 3). Most of the patients under the care of the general surgeons were suffering from obstructive uropathy or dehydration secondary to acute abdominal crises, whilst all the patients who were subsequently found to be suitable for maintenance haemodialysis were under the care of physicians.

TABLE 3

SPECIALITY	No. of Patients with Bl.Urea 100	% of Total
General Medicine	107	65.6
General Surgery	37	22.7
Paediatrics	8	4.9
Orthopaedics	5	3.1
Others	6	3.7
	163	100.0

Speciality under which the 163 patients were admitted

Pre-renal uraemia

The raised blood urea was due to pre-renal factors in 55 out of the 163 patients (34%). These patients have been subdivided into 7 main groups according to the predominant cause of the uraemia and their distribution by age and sex is shown in Table 4.

1. *Cardiac*: Most of the 19 patients (34%) in this subgroup were suffering from ischaemic heart disease and congestive failure. Uraemia was a terminal manifestation in the majority.
2. *Gastro-intestinal*: The 12 patients in this subgroup include 5 cases each of acute intestinal obstruction and gastro-intestinal haemorrhages as well as 2 cases of acute gastro-enteritis. The blood urea returned to normal values

TABLE 4

Causes of Prerenal Uraemia	Age-Groups (yr.)										Grand Total		
	0-9		10-49		50-59		60-69		70-			Total	
	M	F	M	F	M	F	M	F	M	F		M	F
Cardiac	-	-	1	1	2	1	1	1	7	5	11	8	19
Gastro-Intestinal	-	2	3	-	-	1	1	-	2	3	6	6	12
Hepato-Biliary	-	-	1	-	-	1	-	1	1	1	2	3	5
Malignancy	-	-	-	-	-	-	1	2	2	1	3	3	6
Cerebral	-	-	-	-	2	-	-	-	1	2	3	2	5
Respiratory	2	-	1	-	-	-	-	-	1	1	4	1	5
Miscellaneous	-	-	-	-	1	-	1	-	1	-	3	-	3
Total	-	2	6	1	5	3	4	4	15	13	32	23	55

Causes of Prerenal Uraemia by Age and Sex

- after adequate hydration in the 5 patients who survived.
- Hepatobiliary*: 3 of the 5 patients (9%) in this subgroup were in terminal hepatic failure. The other two patients had acute cholecystitis and empyema of the gall-bladder.
 - Malignancy*: 6 patients with prerenal uraemia (11%) had malignant disease. The site of the primary tumour was prostate in two and breast, stomach, caecum and bladder in the other four. All 6 patients died in hospital.
 - Cerebral*: The 5 patients (9%) in this subgroup include 3 old patients dying in hospital from cerebral thrombosis. The other two patients were admitted for hypertensive encephalopathy and were probably suffering from concomitant hypertensive reno-vascular disease.
 - Respiratory*: 4 of the 5 patients (9%) were suffering from acute bronchopneumonia and the blood urea was only transiently raised. The other patient died of pulmonary embolism 4 days following prostatectomy.
 - Miscellaneous*: The 3 patients in this subgroup (6%) died in hospital from pemphigus, septicaemia and haemorrhage following a severe injury.

Renal and Post-renal Uraemia

Primary renal disease and obstructive nephropathy accounted for the raised blood urea in 108 out of the 163 patients studied. These patients were subdivided into 8 main groups according to diagnosis and their age and sex distribution is shown in Table 5. As expected, pyelonephritis and glomerulonephritis were the main causes of renal failure accounting for nearly half of the 108 patients in this category. Pyelonephritis was commoner in females especially in the 60 to 69 age group. Sixteen out of the 20 patients in the obstructive nephropathy group (80%) were males over 70 years and in nearly all these cases, the obstruction was secondary to prostatic disease.

Diabetic nephropathy was the major

TABLE 5

Disorder	Age - Groups (yr.)										Grand			
	0-9		10-49		50-59		60-69		70-		Total		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	%	
Pyelonephritis	-	-	2	-	3	2	3	10	4	5	12	17	29	16.8
Glomerulonephritis	1	-	4	5	2	1	3	5	-	1	10	12	22	20.5
Obstructive nephropathy	-	-	-	-	2	-	-	1	16	1	18	2	20	18.5
Diabetic nephropathy	-	-	1	1	1	2	-	4	2	5	4	12	16	14.8
Hypertensive renal vascular disease	-	-	-	-	-	-	-	3	4	-	4	3	7	6.5
"Nephrotic Syndrome"	-	-	1	4	-	-	-	-	-	-	1	4	5	4.6
Acute Tubular Necrosis	-	-	-	2	-	-	-	-	1	-	1	2	3	2.9
Miscellaneous	1	1	1	-	1	1	-	-	-	1	3	3	6	5.4
Total	2	1	9	12	9	6	6	23	27	13	53	55	108	100%

Main renal disorders by age and sex

cause of renal failure in 12 female and 4 male patients. Ten other patients with renal or postrenal uraemia were found to be suffering from diabetes mellitus, bringing the total number of diabetic patients in this category to 26 (24%).

All the 7 patients with hypertensive renal vascular disease were over 60 years old. The diagnosis was uncertain in 2 out of the 5 patients suffering from the nephrotic syndrome. The other 3 patients had systemic lupus erythematosus, polyarteritis nodosa and congenital nephrosis. Two out of the three patients with acute tubular necrosis were females with severe bleeding in relation to pregnancy. The miscellaneous subgroup was made up of 2 cases of nephrolithiasis and one each of renal hypoplasia, renal tuberculosis, perinephric

abscess and renal amyloidosis. No cases of renal failure secondary to analgesic nephropathy were found.

Discussion

There were 36 patients with uraemia secondary to renal disorders which fell in the age group 10 to 60 years (Table 5). This is the age group where potential patients suitable for long-term haemodialysis are likely to be found. Conservative treatment resulted in clinical remission or cure in 7 patients. Maintenance haemodialysis was thought to be contra-indicated in another 15; this latter group includes 7 patients with diabetes mellitus, 2 suffering from malignant disease and 6 others with severe co-existing extra-renal disease.

Out of the remaining 14 patients, 12

TABLE 6

	10-55		56-60		10-55	56-60
	M	F	M	F	M + F	M + F
Glomerulonephritis	3	2	1	1	5	2
Pyelonephritis	1	1	-	-	2	-
Nephrolithiasis	-	-	1	1	-	2
Congenital Nephrosis	1	-	-	-	1	-

Diagnosis, age and sex in patients requiring Haemodialysis

died from uraemia during 1968 and would have been suitable for immediate haemodialysis. The diagnosis in these 12 patients and their age and sex distribution is shown in Table 6. The other 2 patients were discharged with fairly good renal function but would have probably been accepted for treatment within a year.

Various retrospective surveys (Branch *et al.*, 1971; De Wardener, 1966; Department of Health and Social Security Annual Reports 1968-70) have shown that the incidence of patients requiring maintenance haemodialysis varied from 22 to 75 per million population; however both the sources of information as well as the age group considered varied from one study to the other. In two prospective studies (Pendreigh *et al.*, 1972; McGeown, 1972) in Scotland and Belfast, the incidence for patients under 55 years was 38 and 33 per million population per year respectively.

In this study, 12 patients would have benefited from dialysis giving an incidence of 27.2 per million population per year for patients under 55 years and 40.8 per million per year for patients under 60.

The incidence of chronic renal failure secondary to diabetes mellitus was 14.8% (Table 5). This is consistent with the high incidence of the disease in the Maltese is-

lands (Zammit Maempel, 1968). If the more liberal view for the selection of patients for chronic haemodialysis becomes prevalent making diabetic patients acceptable for such treatment, then the local incidence of patients who would benefit from such treatment would increase to 40.8 per million per year for patients under 55 years and 57.8 per million per year for patients under 60.

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