INTRODUCTION

The incidence and mortality of renal failure remain high [1]. Dialysis continues to be a major supportive intervention in renal failure, but late referral is associated with the risk of higher morbidity and mortality [2–4]. Recent studies indicate that as many as 60% of end-stage renal disease patients begin dialysis less than 3 months post-referral to a renal unit [3–6]; on the other hand, it is estimated that 20–50% of adult patients start chronic dialysis therapy without prior contact with a nephrologist [7]. The percentage of late referral patients varies widely from center to center. Late referral has been described as being associated

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Demographic Analysis of Renal Failure Patients Presenting to the Emergency Unit

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Background: The incidence and mortality of renal failure remain high. Dialysis continues to be a major supportive intervention in renal failure, but late referral is associated with the risk of higher morbidity and mortality.

Methods: We investigated the demographic data of renal failure patients requiring dialysis who presented to our emergency unit between August 2003 and June 2005. Demographic characteristics, presentation complaints, current treatment, initial laboratory values and vascular access type were determined.

Results: Ninety patients (52 male, 38 female; mean age, 56.63 ± 17.33 years) were included in the study. The most common presenting complaints were dyspnea, weakness and edema. Twenty (22.2%) patients had acute renal failure and the other 70 patients had chronic renal failure. Only seven (7.7%) patients had the necessary documents for dialysis treatment, and only six patients had available radial arteriovenous fistula. During follow-up, eight (8.8%) patients died. We found inadequate hemodialysis readiness in our end-stage renal disease patients.

Conclusion: Improving the quality of pre-dialysis care might improve long-term survival, so appropriate timing for nephrology referral is important in patients with end-stage renal disease. [Hong Kong J Nephrol 2007;9(2): 82–5]

Key words: demography, dialysis unit, late referral

背筋: 透析療法可延長腎衰竭患者的壽命，然而不少病人未能及時就診，導致腎衰竭的發生率及死亡率持續偏高。

方法: 研究對象為 2003 年 8 月至 2005 年 6 月期間，至急診求醫並需接受透析的腎衰竭患者。本文對其特徵、主訴、所接受的治療、初期化驗結果，及血管通路類型作出描述及分析。

結果: 共有 90 位 (52 男、38 女；平均年齡 56.63 ± 17.33 歲) 病人被納入，主訴包括氧化、衰弱、及水腫。其中 20 人 (22.2%) 患有急性腎衰竭，慢性腎衰竭患者則有 70 位。他們之中僅得 7 人 (7.7%) 具備透析治療所需的文件，具有橈動靜脈襻管者僅有 6 位。追蹤期間，8 人 (8.8%) 去世。因此，我院在末期腎病患者間血液透析的準備措施上，仍有改進的空間。

結論: 對於至急診求醫且需接受透析的末期腎病患者，我們必須作出及時的轉診與透析前準備，以改善這些病人的預後。
with uremic symptoms, anemia, and derangement in calcium and phosphate homeostasis, prolonged hospitalization and increased mortality. For many of these patients, dialysis treatment must be started under emergency conditions [3]. Many patients require central venous catheter insertions with all of its associated complications [3,8]. These patients experience poor general health, high incidence of untreated uremic complications, increased risk of catastrophic dialysis onset, and increased health care costs once dialysis begins [4]. Late referral was associated with higher risk of death at 1 year after initiation of dialysis [9]. Therefore, the late nephrological referral of renal patients remains a public health problem of considerable importance and represents a particularly unfortunate situation considering the recent advances in managing chronic kidney disease progression and controlling complications [4,10]. The aim of this study was to determine the frequency of late referral and emergency dialysis needed in our patient population.

**Subjects and Methods**

This study was a retrospective analysis of 90 patients who required immediate hemodialysis treatment after presenting to the emergency unit of Haseki Training and Research Hospital, Turkey, between August 2003 and June 2005. All consecutive patients in need of renal replacement therapy, chronic or acute, were enrolled. Their demographic data, presenting complaints, comorbid conditions, renal disease etiologies, vascular access type, medications and laboratory values (creatinine, calcium, phosphorus, sodium, potassium, albumin, hematocrit) were collected from their hospital charts after obtaining written informed consent. Dialysis data were retrieved from dialysis charts. Results are presented as mean ± standard deviation (SD) or as a percentage.

**Results**

A total of 90 patients (mean age, 56.63 ± 17.33 years; age range, 21–80 years) were included in the study. There were 52 men (mean age, 53.12 ± 17.97 years) and 38 women (mean age, 57.71 ± 16.80 years). The most common presenting complaints were dyspnea, weakness and edema. Six (6.6%) patients were unconscious, six (6.6%) patients had dysuria, and 22 (24.4%) had severe hypertension. Twenty (22.2%) patients had acute renal failure, and the other 70 patients had chronic renal failure (7.14% postrenal, 17.1% glomerulonephritis, 4.2% nephrolithiasis, 4.28% pyelonephritis, 2.8% polycystic kidney disease, 27.1% diabetic nephropathy, 28.8% unknown etiology). Seventy (77.7%) patients were not aware of their diagnosis, and 17 (18.8%) patients had been diagnosed in the last 3 months. Only seven (7.7%) patients had the necessary medical care and insurance documents for dialysis treatment.

Seventeen (18.8%) jugular, 13 (14.4%) femoral, and 54 (60%) subclavian catheters were used for vascular access. Only six (6.6%) patients had available radial arteriovenous fistula. Three (3.3%) patients were taking angiotensin-converting enzyme inhibitors, 10 (11.1%) were taking erythropoietin, 19 (21.1%) iron, 16 (17.7%) vitamin D, and 27 (30%) were taking calcium carbonate. The presenting laboratory findings are shown in the Table.

During follow-up, eight (8.8%) patients died. Five (5.5%) patients did not require further dialysis; the remaining patients continued with the chronic hemodialysis program.

Table. Presenting laboratory findings of the chronic renal failure patients

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creatinine (mg/dL)</td>
<td>7.85 ± 4.82</td>
<td>2.8–18.7</td>
</tr>
<tr>
<td>Calcium (mg/dL)</td>
<td>7.52 ± 1.51</td>
<td>3.6–11.0</td>
</tr>
<tr>
<td>Phosphate (mg/dL)</td>
<td>5.19 ± 1.91</td>
<td>3.0–12.6</td>
</tr>
<tr>
<td>Sodium (mmol/L)</td>
<td>134.52 ± 5.93</td>
<td>114.0–146.0</td>
</tr>
<tr>
<td>Potassium (mmol/L)</td>
<td>4.81 ± 1.07</td>
<td>3.0–7.6</td>
</tr>
<tr>
<td>Albumin (g/dL)</td>
<td>3.22 ± 0.72</td>
<td>1.2–4.7</td>
</tr>
<tr>
<td>Hematocrit (%)</td>
<td>28.00 ± 7.83</td>
<td>17.4–53.6</td>
</tr>
</tbody>
</table>

**Discussion**

The number of patients with end-stage renal disease requiring renal replacement therapy is constantly increasing [3]. Many chronic renal failure patients present to the emergency unit with a need for dialysis [3–5]. Ideal management of advanced chronic kidney disease includes timely dialysis preparation, and an informed choice of the most appropriate dialysis method [4]. The prognosis and outcome in patients with end-stage renal disease is significantly related to predialysis care and early or late nephrological referral [11]. Late referral to nephrologists of patients with chronic kidney disease is a major public health problem [12]. As in the literature, we also discovered inadequate hemodialysis preparation in our end-stage renal disease patients. Late referral is associated with a greater risk of emergency, unplanned initiation of dialysis, higher hospital costs, longer duration of initial hospitalization, and worse long-term survival on renal replacement therapy [5,12]. Late referral was associated with a higher risk of death at 1 year after initiation of dialysis [9]. Of our patients, 68 were late referrals and eight of them died. In our national registry (2004), it was
reported that 31% of hemodialysis patients die within the first 3 months of dialysis [13]. The main problem with late referral is not that the time is insufficient to prepare the patient for renal replacement therapy, but more that late referral patients do not have the opportunity for timely treatment of the factors leading to vascular comorbidity such as hypertension, anemia, hyperglycemia, hyperlipidemia or hyperphosphatemia [3]. We determined anemic values in our patients (mean hematocrit was 28 ± 7.83%). Clinical studies have shown that anemia is associated with reduced survival in patients with renal disease [14]. There is good evidence to suggest that achieving adequate hematocrit levels reduces morbidity and mortality in patients with end-stage renal disease [15]. Therefore, anemia management should begin as early as possible [16]. Likewise, hypoalbuminemia is a powerful predictor of mortality in patients with chronic renal failure, and the major cause of it in this population is cardiovascular events [17]. Our patients had hypoalbuminemic values (albumin 3.22 ± 0.72 g/dL). Hypoalbuminemia is common in patients with end-stage renal disease [18]. Most patients with progressive chronic renal disease develop hyperphosphatemia. An elevated phosphate level is an important risk factor for the development of calcification and cardiovascular mortality in chronic renal disease patients [19]. But we did not decrease high phosphate levels in our patients. We found that 22 patients had severe hypertension and 19 patients had diabetes. Diabetic patients are prone to vascular access problems. We also found that only six patients had available radial arteriovenous fistula. Some investigators have shown that placement of a catheter or graft, instead of the timely construction of an arteriovenous fistula, and unplanned dialysis increase morbidity and mortality in chronic renal failure patients [3,8]. Furthermore, a delay in providing an adequate arteriovenous fistula entails significant increases in treatment-related costs [8]. Late nephrologist referral is an independent risk factor for early death on dialysis [20]. These findings suggest that several factors increase the risk that patients with chronic kidney disease will have their first nephrologist consultation excessively late in the course of their disease. To reduce the high mortality rate on dialysis, patients should receive professional nephrological care as early as possible in the course of renal disease, not only to slow renal failure progression, but equally important to prevent or treat comorbidities, especially vascular disease, early and aggressively [4].

The detrimental effects of late referral are increased emergency inpatient dialysis and health care resource usage. Late referral and the presence of severe comorbidities seem to be the most powerful predictors of a reduced chance to choose the therapy best suited to the patient’s individual lifestyle. Once the patient has been referred to specialist care, the best clinical practice is more effective if delivered within the framework of structured multidisciplinary educational programs. A National Institute of Health consensus publication recommends early referral to a multidisciplinary renal care team, and the recent Canadian Society of Nephrology guidelines recommend that at least 12 months are needed prior to initiation of dialysis for adequate medical and psychologic preparation for renal replacement therapy [21].

Insufficient time for early intervention is reflected not so much by the period from referral to renal replacement therapy, but by renal function at the patient’s first visit to a nephrologist. Improving the quality of predialysis care might improve long-term survival, so appropriate timing of nephrology referral is important in patients with end-stage renal disease.

REFERENCES