EARLY MORTALITY RATE IN END-STAGE RENAL DISEASE PATIENTS INITIATING HEMODIALYSIS

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Abstract: Early referral of patients with chronic renal failure (CRF) to a nephrologist improves morbidity and delays mortality after start of renal replacement therapy (RRT). Late referral is associated with increased cardiovascular morbidity and short-term mortality.

The aim of this study was to assess the factors associated with early mortality rate in ESRD patients, during the first month after initiating hemodialysis.

One hundred and eighty nine 189 patients hospitalized at the Department of Nephrology in Skopje after starting RRT and followed up during the first month were included in this study. Early referrals were considered those who had been referred to a nephrologist for more than 3 months before initiating RRT. Female to male ratio was 93 to 96 (49/51%). Out of them, 110 were late referrals, and 79 early ones (58/42%). Out of 189, 20 patients died during the first month of follow up (10.6%). 85% of the patients who died were late referrals, not having time and opportunity to be treated for renal anemia, for malnutrition and prevention of cardiovascular and uraemic complications, and all of them lacked permanent vascular access. Early mortality was also associated with older age, renal anemia and malnutrition. Late referrals were also older, predominantly male and had higher serum potassium levels. The main causes of death were related to uraemic intoxication, malnutrition and inflammation as well as lack of permanent vascular access, all of it leading to sepsis, and cardiovascular complications.

Key words: early referral, late referral, early mortality, end-stage renal disease.
Introduction

Morbidity and mortality in ESRD (end-stage renal disease) patients is higher compared to subjects of same age in the general population. Factors affecting this high mortality rate in patients on hemodialysis are multiple, including quality of dialysis procedures, nutritional status of patients, comorbidity, age, ethnicity, diabetes prevalence, and perhaps considered insufficiently, the quality and duration of the predialysis nephrological care [1]. Early referral of patients with chronic renal failure (CRF) to a nephrologist and regular follow up consequently, would improve their cardiovascular and nutritional status leading to smaller prevalence of atherosclerotic arterial events such as myocardial or cerebrovascular infarction and heart failure at their start of renal replacement therapy (RRT) [2]. Many patients with CRF are not referred to nephrologists until shortly before ESRD. This late referral prevents treatment aimed at slowing kidney disease and maintaining cardiovascular health from beginning early enough to be useful. It needs starting dialysis on an emergency basis, without adequate preparation, and increases short-term mortality [3].

Objectives

The aim of the study was to assess the factors associated with early mortality rate in ESRD patients, during the first month after initiating hemodialysis.

Materials and Methods

A prospective epidemiology survey has been conducted at the Department of Nephrology – University Clinical Centre – Skopje, in 2001, in order to evaluate the incidence of ESRF pts requiring RRT in the whole country.

A total of 214 pts started hemodialysis, an incidence of 107/million population. 189 have been hospitalized or followed up during the first month and were included in this study. The variables studied were: age, gender, time of referral to a nephrologists, death, cause of death, serum hemoglobin, hematocrit, albumin, total lipids, triglycerides, cholesterol, sodium, potassium, phosphate, calcium, alkaline phosphatase, uric acid. Early referrals have been considered those who had been referred to a nephrologist for more than 3 months before initiating RRT.

Statistical analysis was performed using the statistical software Statistica for Windows 6.0. Univariate statistical analysis using Student-t test for independent variables to compare numerical data and $X^2$ test to compare nominal data was used. The value of $p < 0.05$ was taken as significant.
Results

A total of 189 patients were followed during the first month after initiating maintenance hemodialysis. Most of them had been hospitalized. Female to male ratio was 93 to 96 (49/51%). Out of them, 110 were late referrals, and 79 early ones (58/42%).

Table 1 shows only the variables that significantly differ between early and late referrals.

Table 1 – Таблица 1

 Variables that significantly differ between early and late referrals
Параметри со синдицификани разлика мезу рано и доцна уйайени

<table>
<thead>
<tr>
<th>Variable</th>
<th>Early referrals</th>
<th>Late referrals</th>
<th>P &lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>52.2 ± 13.9</td>
<td>58.6 ± 14.4</td>
<td>0.005</td>
</tr>
<tr>
<td>sPotassium (mmol/l)</td>
<td>6.1 ± 1.18</td>
<td>6.9 ± 1.11</td>
<td>0.005</td>
</tr>
<tr>
<td>Male/female</td>
<td>32/47</td>
<td>64/46</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Out of 189, 20 patients died during the first month of follow up (10.6%). Table 2 shows the factors associated with early mortality rate, during the first month of follow up. The main causes of death were: sepsis in 25%, acidosis in 25%, acute heart failure in 25%, stroke in 15% and malnutrition in 10% of the patients.

Table 2 – Таблица 2

 Variables associated with early mortality rate in ESRD patients initiating hemodialysis
Параметри асоцирани со раној мортиалитет кај пациенти со терминална бубренска болест кои започнуваат со хемодиализна терапија

<table>
<thead>
<tr>
<th>Variable</th>
<th>Died</th>
<th>Survived</th>
<th>P &lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male/female</td>
<td>9/11</td>
<td>87/82</td>
<td>n.s.</td>
</tr>
<tr>
<td>Early/late referral</td>
<td>3/17</td>
<td>76/93</td>
<td>0.01</td>
</tr>
<tr>
<td>Age (years)</td>
<td>67.6 ± 13.05</td>
<td>54.4 ± 13.8</td>
<td>0.0005</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>0.19 ± 0.05</td>
<td>0.27 ± 0.2</td>
<td>0.01</td>
</tr>
<tr>
<td>sAlbumin (g/l)</td>
<td>27.7 ± 2.9</td>
<td>36.0 ± 6.9</td>
<td>0.05</td>
</tr>
</tbody>
</table>


**Discussion**

The main focus of clinical trials in patients with chronic kidney disease (CKD) before ESRD has been on prevention of progression to ESRD. This focus has undeniably been beneficial to the patients. A decline in the incidence of ESRD due to glomerulonephritis and of type 1 diabetes mellitus has been noticed, a marked improvement of the fraction of ESRD patients receiving appropriate doses of dialysis and achieving better hematocrits, and a parallel decline in the mortality among patients with ESRD [4]. But, in order to introduce prevention measures in patients with CKD, patients need to be referred to a nephrologist within an optimal time period. Late referral of CKD patients has been associated with adverse effects later, during their RRT. This has been reported by many nephrologists from different countries in Europe [5–16]. Not only does late referral delay the introduction of measures to attenuate the progressive loss of kidney function and prevent the uraemic complications, but it has also numerous short and long-term deleterious effects on clinical outcome [17]. The only study that did not confirm the long-term harmful effects of late referral is the study of Roubicek et al. [18].

Our study assessed the factors associated with short-term mortality in ESRD patients after initiating hemodialysis. As in the other studies, it confirmed that early mortality in ESRD patients is associated with late referral, as well as with older age, renal anemia and malnutrition. Late referrals were also older, predominantly male and had higher serum potassium levels. The main causes of death were related to uraemic intoxication, malnutrition and inflammation as well as lack of permanent vascular access, all of it leading to sepsis, and cardiovascular complications. 85% of the patients who died were late referrals, not having time and opportunity to be treated for renal anemia, for malnutrition and prevention of cardiovascular and uraemic complications, and all of them lacked permanent vascular access.

**Conclusion**

In order to improve morbidity and mortality in CKD patients, they should be early referred to a nephrologist. Better structuring of the cooperation between general practitioners and nephrologists appears to be the most effective means of improving management of kidney disease. In this regard, the creation of specific healthcare networks appears to be the most appropriate response to this problem.
REFERENCES


Резиме

РАН МОРТАЛНОТО КАЈ ПАЦИЕНТИ СО ТЕРМИНАЛНА БУБРЕЖНА БОЛЕСТ КОИ ЗАПОЧнуВААТ
СО ХЕМОДИАЛИЗНА ТЕРАПИЈА

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Раното упатување на болни со хронична бубрезна слабост (ХБС) кaj нефролог го намалува морбидитетот и го одложува морталитетот по започнувањето со реналната заместителна терапија (РЗТ). Доцното упатување е асоциирано со зголемен кардиоваскуларен морбидитет и ран морталитет.

Целта на оваа студија беше да се проценат факторите асоциирани со раноот морталитет кај болни со терминална бубрезна болест (ТББ) за време на првот месец по започнувањето со хронична хемодиализа.

Во студијата беа вклучени 189 болни госпитализирани на Клиниката за нефрологија во Скопје по започнувањето со РЗТ и следени во првот месец. Рано упатени болни се сметаа оние кои биле упатени кaj нефролог пред повеќе од 3 месеци пред започнување со РЗТ. Односот жен/мации беше 93:96 (49/51%). Доцна упатени беа 110, а рано упатени само 79 (58/42%). Дваесет болни (од 189) егзитираа во првот месец од следењето (10.6%). 85% од болните кои егзитираа беа доцна упатени, без да имаат време и можност за терапија на нивната ренална анеемија, малинутриција како и превенција на кардиоваскуларните и уремични компликации, и кај сите недостасуваше траен васкуларен пристап. Раното морталитет беше асоцииран со постара возраст, ренална анеемија и малинутриција. Доцна упатени болни беа, исто така, постари, претежно мации и имаа повисок серумски калиум. Главните причини за смртта се долгожива уремична интокси-
кација, малнуртриција и инфламација, како и отсуство на траен васкуларен пристап, што се заедно водеше до сепса и кардиоваскуларни компликации.

Ключни зборови: рано упатени, доцна упатени, ран морталитет, терминална бубрежна болест

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