Features of Hemodialysis in Cirrhotic Patients: Single Center Experience

Sirotik Hastalarda Hemodiyalizin Özellikleri: Tek Merkez Deneyimi

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ABSTRACT

OBJECTIVE: End-stage kidney disease and advanced cirrhosis are sometimes seen concomitantly. Our purpose was to compare hemodialysis (HD) sessions in critically ill cirrhotic patients from ICU versus stable cirrhotic patients from outpatient clinic, and observe endurance of both stable and acutely ill cirrhotic patients to intermittent HD.

MATERIAL and METHODS: All of the Child-Pugh class B or C cirrhotic patients requiring renal replacement therapy during a period of three years were included in the study. If hypotension, arrhythmia, bleeding, or any other health problems were present during dialysis, the dialysis session was regarded as a troubled session.

RESULTS: There were two groups of patients. All of the stable patients lived more than three months, whereas all patients in the ICU group died within a month. Mean ultrafiltration volume per session was 1786±210 ml in ICU and 1616±266 ml in stable patients ($p>0.05$). The number of the troubled sessions was 24 in ICU and 1 in stable patients ($p<0.0001$). Bleeding was a problem in a minority of the patients.

CONCLUSION: Intermittent HD may be an acceptable choice for stable cirrhotic dialysis patients. Hypotension is a frequent complication of intermittent HD in ICU patients.

KEY WORDS: Dialysis, Hemodialysis, Cirrhosis

ÖZ

AMAÇ: Son dönem böbrek yetmezliği ve ağır siroz bazen birlikte görülmektedir. Amacımız, yoğun bakımda yatan istikrarsız sirotik hastalar ile stabil sirotik hastaların hemodiyaliz (HD) seanslarını karşılaştırarak her iki gurup hastanın HD toleransını gözlemlemekti.

GEREÇ ve YÖNTEMLER: Üç yıllık bir dönem içinde, renal replasman tedavisi gerektiren bütün Child-Pugh B ve C grubu siroz hastaları çalışmaya dahil edildi. Diyaliz sırasında hipotansiyon, aritmi, kanama veya diğer sağlık problemlerinin ortaya çıkması durumunda, o diyaliz seansı sorunlu seans olarak tanımlandı.

BULGULAR: İki gurup hasta vardı: İstikrarlı hastalar ve yoğun bakımlarda yatan istikrarsız hastalar. Bütün istikrarlı hastalar üç aydan fazla yaşadılar; buna karşılık yoğun bakım hastalarının tamamı 1 ay içinde öldüler. Seans başına ortalama ultrafiltrasyon hacmi, istikrarlı hastalarda 1616±266 ml, yoğun bakım hastalarında 1786±210 ml idi ($p>0.05$). Sorunlu seans sayısı istikrarlı hastalarda bir, yoğun bakım hastalarında 24 idi ($p<0.0001$). Hastaların %50'sinde heparin ile antikoagülasyon uygulanmasına rağmen, kanama, her iki gurupta da düşük idi (tüm seansların %2.4'ünde görüldü).

SONUÇ: İstikrarlı hastalarda aralıklı HD makul bir renal replasman seçeneği olabilir, ancak yoğun bakım hastalarında hipotansiyon sık görülen bir sorundur.

ANAHTAR SÖZCÜKLER: Diyaliz, Hemodiyaliz, Siroz

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INTRODUCTION

End-stage kidney disease and cirrhosis are sometimes seen concomitantly. There is no consensus on dialysis modality in terms of determining the optimal way of treating these patients (1). It has been claimed that peritoneal dialysis should be preferred because of higher rate of intradialytic complications in hemodialysis (HD) (2). However, it should be emphasized that the referred data has been mostly obtained from acutely ill cirrhotic HD patients. As a matter of fact, objective data on advanced stage cirrhotic patients that are on long term HD are insufficient (3).

Prognosis of cirrhotic patients with acute kidney injury (AKI) varies depending on the etiology of AKI. Because the three-month probability of survival in hepatorenal syndrome has been reported to be a low success rate, renal replacement therapy (RRT) is not recommended except in some exceptional conditions (4,5).

Our purpose was to compare HD sessions in critically ill cirrhotic patients from ICU versus stable cirrhotic patients from outpatient clinic, and observe endurance of both stable and acutely ill cirrhotic patients (Child-Pugh B and Child-Pugh C) to intermittent HD.

MATERIALS and METHODS

All patients were treated at the HD unit of a tertiary referral center and teaching hospital, Turgut Ozal Medical Centre, Inonu University, Malatya, Turkey, between 2010 and 2013. The data were collected retrospectively. The patients had advanced cirrhosis (Child-Pugh B or C) prior to the initiation of dialysis. All patients diagnosed with cirrhosis and renal failure (covering both acute kidney injury and chronic renal failure patients) requiring HD were included in the study. Meanwhile only one patient received peritoneal dialysis. In the following period he was transferred to HD letting us include his data in our study as well. Our analysis excludes post-operative dialysis of the patients with liver transplantation. Cirrhosis was diagnosed by hepatology specialists. The follow-up was not different from that of other patients. All patients were treated by bicarbonate buffered intermittent HD. Dialysate Na, K, and glucose composition were as follows: Na 140 mmol/L, K 2 mmol/L, and glucose 1 mmol/L in all the sessions. Vital signs were recorded once or twice per hour depending on the case and all complaints and treatments during the session were recorded by the nurses. Later on, all data were transferred to digital media. Bleeding, hypotensive symptoms, and other health problems (i.e. epileptic discharge) during the dialysis were also noted. The presence of such issues marked the session a troubled one. Hypotension was defined as systolic blood pressure being lower than 90 mmHg and/or the presence of hypotensive symptoms. The total number of HD patients and of dialysis sessions throughout the study was obtained from electronic database of the hospital (ENLİL®). The Child-Pugh classification was used to define the stage of hepatic disease (6). All procedures were in accordance with the declaration of Helsinki. Oral consent was obtained from the patients or their relatives. The data were collected retrospectively, and analyzed by using Statistical Package designed for the Social Sciences (SPSS) software, version 17.0 (SPSS Inc., Chicago, IL, USA). Descriptive data are presented as medians and ranges. Normality of the data was tested through One Sample Kolmogorov-Smirnov test. Groups were compared using the Mann-Whitney U and Chi-Square tests, where appropriate. A P value <0.05 was considered statistically significant.

RESULTS

Eleven patients could be identified during the study; 8 males and 3 females with a median age of 56 years (range 54). Eight patients had cryptogenic cirrhosis, two hepatitis B, and one alcohol-related cirrhosis. The median Child-Pugh score was 11 (range 4). In total, there were 109 sessions, but only 84 sessions were eligible for the final analysis (charts of 25 sessions were lacking). Some of the characteristics of the patients and the dialysis sessions are shown in Table I.

Five patients were on chronic dialysis (45 %) and lived more than 3 months; HD was initiated during hospitalization in six patients (55%) all of whom lived shorter than 3 months. Seven of the 11 patients were followed at the intensive care unit (ICU); others were either outpatients, or ordinary ward patients. Two patients at ICU were on chronic dialysis prior to the hospitalization; in others, the dialysis was initiated during the last hospitalization, but it was completely unknown whether they had chronic renal disease or not. None of the patients had precise etiological diagnosis of the renal disease. The vascular access route was a central venous catheter in nine, and arteriovenous fistula in two.

Heparin was used in 42 sessions (50%), and there were only 2 bleeding episodes (2.4%) with minor bleedings. Hypotension was observed in 1 of 33 sessions of the outpatients, whereas it was observed in 22 of 51 sessions of the ICU patients. Systolic blood pressure was below 90 mmHg prior to the onset of dialysis in 5 sessions. On the whole, 32 outpatient sessions and 29 ICU patient sessions were free of any issues.

During this period, 33936 HD sessions have been performed in 946 patients. The ratio of the cirrhotic patients was 1.2%, and the ratio of all the sessions was 0.32%.

DISCUSSION

As the results of this study suggests, the prevalence of the concomitant cirrhosis and end-stage renal disease is relatively low. The prevalence may be variable in accordance with the region, depending on the prevalence of Hepatitis B and Hepatitis C infections, and amount of alcohol consumption. Amount of alcohol consumption in Turkey is relatively low compared to most European countries (below 4 liters per person vs. 12

Table I: Characteristics of the patients and the dialysis sessions

	All Patients (n=11) All Sessions (n=84) (Median / Range)	ICU Patients (n=7) Sessions (n=51) (Median / Range)	Outpatients (n=4)[a] Sessions (n=33) (Median / Range)	ICU vs. Outpatients
Age (years)	56 / 54	57 / 16	52.5 / 54	p>0.05[b]
Child-Pugh Score	11 / 4	13 / 3	9 / 0	p<0.005[b]
MAP1	90 / 124	86.6 / 124	91 / 50.7	p>0.05[b]
MAP2	80.2 / 95.3	76 / 95.3	86 /46	p<0.001[b]
MAP3	70.3 / 100	67 / 100	80 / 41.3	p<0.002[b]
Session Length (min)	180 / 185	180 / 185	180 / 120	p>0.05[b]
Ultrafiltration Volume(ml)	1550 / 4860	1600 / 4860	1250 /4000	p>0.05[b]
Blood Flow (ml/min)	400 /200	377.5 / 200	400 / 50	P<0.007[b]
Bleeding				
Present, n (%)	2 (2)	2 (4)	0	p>0.05[c]
Absent, n (%)	82 (98)	49 (96)	33 (100)	
Hypotension				
Present, n (%)	23 (27)	22 (43)	1 (3)	p<0.0001[d]
Absent, n (%)	61 (73)	29 (57)	32 (97)	
Troubled Session				
Present, n (%)	25 (30)	24 (47)	1 (3)	p<0.0001[e]
Absent, n (%)	59 (70)	27 (53)	32 (97)	

MAP1: Mean arterial pressure at the beginning of the session (mmHg), **MAP2:** Mean arterial pressure at the end of the session (mmHg), **MAP3:** Lowest mean arterial pressure throughout the session (mmHg), **Troubled Session:** Any session requiring the intervention for any problem (bleeding, hypotension, convulsion, etc.), [a] includes ordinary ward patients, [b] Mann-Whitney U Test, Chi-Square test, [c] $[\chi^2 (1, N = 84) = 1.32, p > 0.05]$, [d,e] $[\chi^2 (1, N = 84) = 16.2, p < .0001]$

liters per person in some other countries) (7). Prevalence of the Hepatitis B in Turkey was estimated to be 4.57%; the same value is 6.72% in our region (Eastern Anatolia) (8). On the other hand, the prevalence of Hepatitis C is relatively low in the region, and it is estimated to be around 1% (ranging between 0.6-2.2%) (9).

Development of renal failure in cirrhotic patients is associated with increased mortality (1,10,11). Our analysis shows prominent differences between ICU and "stable" cirrhotic dialysis patients in terms of both prognosis and intradialytic complications. All of our ICU patients died within a month; similarly, Witzke O et al. reported that none of their 15 cirrhotic patients on respiratory support unit could live more than 30 days, despite RRT (11). Existing data suggest that RRT for acutely ill cirrhotic patients is futile; the use of RRT in these patients may only be for the sake of gaining time for liver transplantation, if possible at all (1, 10,11). Lack of clear regulations and unresolved ethical issues in some countries also may justify more liberal use of RRT in such patients. Tolerance to intermittent HD in these patients was not promising; nearly half of the sessions were problematic. Most frequent problem was hypotension though bleeding did not appear to be a major problem. The need for anticoagulation in these patients may be questioned, but other authors also needed to use different forms of anticoagulation without major bleeding problems (11).

There is no proven superiority of continuous renal replacement therapies over intermittent hemodialysis in hemodynamically stable patients. It has been suggested that continuous RRT may be the preferable modality in patients who are hemodynamically unstable and carry the risk of increased intracranial pressure (12). There was very high rate of ultrafiltration in some sessions of ICU patients (e.g. 4860 ml per session); the patient has been hypertensive at the start of that session, and huge amount of fluid has been removed without hypotension.

On the other hand, endurance of our "stable" patients to intermittent HD was acceptable, and the progress for survival

was better than that of acutely ill patients. Therefore HD may be beneficial in reducing short-term mortality in similar patients. Capling and Bastani reported that HD prolonged survival in type 1 hepatorenal syndrome patients, but the quality of life was poor due to increased morbidity and hospitalizations (13). Although we did not assess quality of life formally, it seemed to be quite satisfactory in some of the "stable" patients. The authors reported that there were "numerous episodes of hypotension during dialysis sessions" though without a numerical value. Our findings do not support this observation. The reason for this difference is not obvious. We used bicarbonate-based dialysis, again, but there is no information whether they used acetate- or bicarbonate-based dialysis, which may obviously affect the complication rate.

The retrospective nature of the study, small number of patients and missing data are main limitations of the study.

CONCLUSIONS

Intermittent HD may be an acceptable choice for stable cirrhotic dialysis patients. On the other hand, survival of acutely ill ICU patients is very short, making the overall benefits of HD questionable. Thus, it can safely be claimed that when it is applied, hypotension complicates HD frequently.

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