ORIGINAL RESEARCH PAPER

Medicine

KEY WORDS: Quality Of Life, Dialysis Therapy, Charlson Comorbidity Index

CHARLSON COMORBIDITY INDEX AND QUALITY OF LIFE IN CHRONIC DIALYSED PATIENTS

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ABSTRACT

Aim: Many patients with end-stage renal disease have additional comorbidities that are important to clinical study and impact the patient's outcome. The Charlson Comorbidity Index (CCI) is a popular tool and a strong predictor of outcome in end-stage renal disease patients. We obtained comorbidity data from the dialysis unit discharge database and analysed the CCI impact on QoL of patients undergoing dialysis therapy. Material and methods: We evaluated the medical records of a total of 254 patients on chronic dialysis therapy: 243 patients undergoing maintenance hemodialysis (HD) and 11 patients on peritoneal dialysis (PD). The outcome of interest was health related quality of life (HRQOL), which was measured using the Kidney Disease Quality of Life-Short Form (KDQOL-SF-36). We calculated CCI scores at the start of HD with information from the hospital discharge summary and analysed the influence of Charlson Comorbidity Index on QoL of chronic dialysed patients. Results: Our study has found a CCI in a range of 2-9 points. We did not recorded a significant difference between HD and DP group (Chi-square = 8.604, p = 0.282). HRQOL was significantly lower for patients who had more comorbid disease. Conclusions: The CCI scores recorded a significant negative impact on QoL in patients undergoing maintenance HD.

INTRODUCTION

Hemodialysis (HD) and peritoneal dialysis (PD) are important renal replacement treatment in end stage renal disease (ESRD), but the influence of CCI on QOL in both modalities in Romania is lacking. Various instruments have been used in the studies involving dialysis patients, including: the Charlson Comorbidity Index (CCI)[1], a generic index developed from a general medical inpatient population; the Index of Coexistent Diseases (ICED)[2], a generic tool modified for dialysis patients; and the Davies and Wright-Khan indices[4], both developed specifically for dialysis populations. A measure of comorbidity in dialysis patients must not only predict outcomes but also be reproducible and easy to obtain.[5]

MATERIAL AND METHODS

This was a prospective cross-sectional observational study performed in a single dialysis unit, B.Braun Avitum Botosani, Romania, in october 2015, that included a total of 254 hemodynamic stable patients (divided into two groups: 243 patients on HD therapy and 11 patients on PD therapy) following the inclusion criteria: 1) on regular HD therapy for more than three months; 2) age > 18 years; 3) no hospitalization or acute illness in the preceding 3 months; 4) no psychiatric disorders (like mental retard or dementia). Informed consent was obtained from all the study participants before enrolment in the study. All patients completed the SF-36 questionnaire.

Quality of life questionnaire was measured using a RAND Short Form 36- Items Health Survey (version 1.0) which includes eight health concept: 1)Physical Functioning (PF); 2)Role limitation due to Physical Functioning (RPF); 3)Bodily Pain (BP); 4)General Health Perception (GH); 5)Vitality (VT); 6)Social Functioning (SF); 7)Role Limitation due to Emotional problems (REP); 8)Mental Health. Raw score of each dimension are transformed into a score ranging from 0-100. Higher scores indicate better health. Comorbidities and medical history were obtained from from each patient medical and dialysis report.

Charlson Comorbidity Index[1] is a method of categorizing como rbidities of patients based on the International Classification of Disease (ICD) diagnosis codes found in hospital administrative/ abstracts data. Dr. Mary E. Charlson, a clinical epidemiologist and methodologist who was interested in improving clinical outcome in both medical and surgical patients, first published the index in 1987 at Cornell University in Ithaca, New York. The Charlson Index is a list of 19 pathologic conditions (Tab. 1). Based on the proportional hazards regression model that Charlson constructed from clinical data, each condition is an assigned a weight from 1 to 6. The Charlson Index score is the sum of the weights for all concurrent diseases aside from the primary disease of interest. A score of zero indicates that no comorbidities were found. The higher the score, the more likely the predicted outcome will result in mortality or higher resource use.

Table no 1. Weighting for Charlson Comorbidity Index Scoring

Score	Condition
1	Coronary artery disease Congestive heart failure Chronic pulmonary disease Peptic ulcer disease Peripheral vascular disease Mild liver disease Cerebrovascular disease Connective tissues disease Diabetes Dementia
2	Hemiplegia Moderate-to-severe renal disease Diabetes with end-organ damage Any prior tumor (within 5 y of diagnosis) Leukemia Lymphoma
3	Moderate-to-severe liver disease
6	Metastatic solid tumor AIDS (not only HIV positive)

AIDS, acquired immune deficiency syndrome; *HIV,* human immun odeficiency virus.

RESULTS

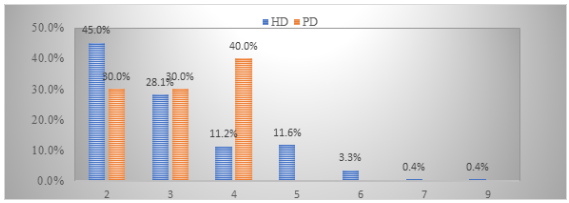

Fig. 1. Comparative data of Charlson Comorbidity Index between both groups

Table no 2 . Pearson's correlation between CCI scores and SF-36 items in both groups

CCI		PF	RPH	REP	VT	MH	SF	BP	GH	QoL
HD group	Pearson's correlation	-.287**	-.240**	-.164*	-.263**	-.195**	-.240**	-.216**	-.217**	-.288**

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	p	.000	.000	.011	.000	.002	.000	.001	.001	.000
	N	243	243	243	243	243	243	243	243	243
DP group	Pearson's correlation	.212	-.473	-.381	.144	.064	.498	.040	.069	-.178
	p	.556	.168	.278	.691	.861	.143	.912	.849	.622
	N	11	11	11	11	11	11	11	11	11

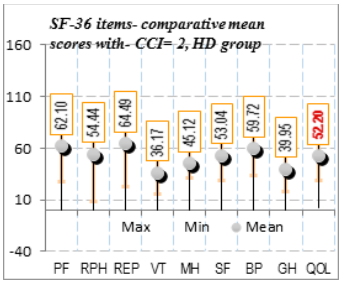
CCI- Charlson comorbidity index; HD group - hemodialysed group; PD group - peritoneal dialysed group; PF- physical functioning; RPF- role limitation due to physical functioning; REP- role limitation duet o emotional problems; VT- vitality; MH – mental health; SF- social functioning; BP- bodily pain; GH- general health.

Table no 3. Kruskal-Wallis test results for comparative data of SF-36 items with CCI scores in HD group

SF-36 item	Chi-square	p	SF-36 item	Chi-square	p
PF	24.604	**0.001**	**MH**	13.355	0.064
RPF	21.524	**0.003**	**SF**	16.900	**0.018**
REP	10.864	0.145	**BP**	15.096	**0.035**
VT	18.273	**0.011**	**GH**	23.441	**0.001**
QOL	26.409	**0.000**			

CCI- Charlson comorbidity index; HD group - hemodialysed group; PD group - peritoneal dialysed group; PF- physical functioning; RPF- role limitation due to physical functioning; REP- role limitation duet o emotional problems; VT- vitality; MH – mental health; SF- social functioning; BP- bodily pain; GH- general health.

Figure 2. a) - f). Mean comparative scores of SF-36 dimensions for CCI scores 1 to 6 in HD patients



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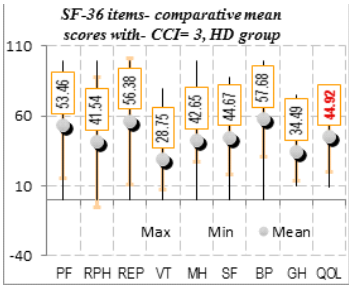

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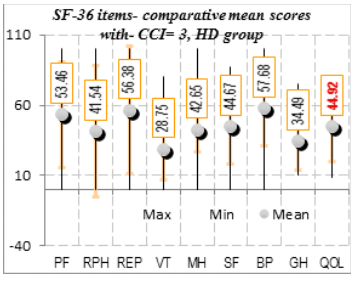

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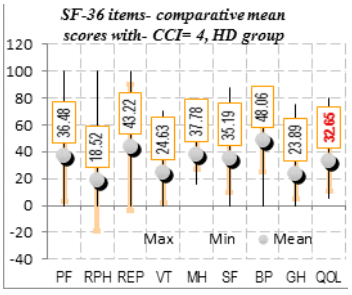

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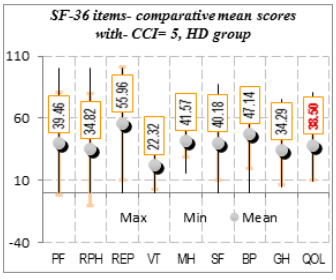

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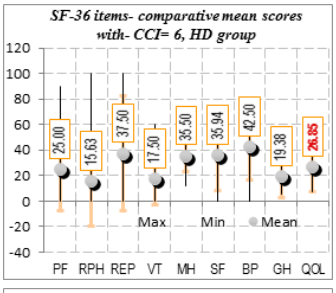

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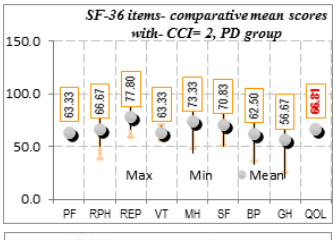

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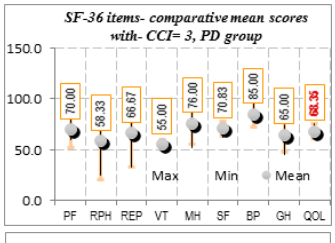

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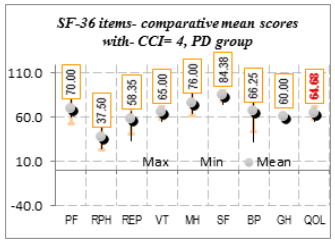

(c)

Figure 3. a) – c) Mean comparative scores of SF-36 dimensions for CCI scores 2 to 4 in PD patients

DISCUSSION

Damage or loss of function in an organ, which is not directly caused by the primary disease, can be referred to as a comorbidity. Up until the late 1980s, the effects of comorbidities were largely unquantifiable and subjective. As a result, certain beliefs and attitudes in clinical practice were based mostly on anecdotal data rather than on appropriate evidence-based information. The most extensively studied and most commonly used comorbidity scoring scheme in medicine is the *Charlson Index score.* Overall, 254 patients were included in the analyses. Mean age was 57.79 14.30 years old and mean dialysis vintage was 64.78 47.72 months. 55,1% from study sample were males. Regarding the modality of dialysis, 95.7% of patients were on hemodialysis. Our study has found a Charlson Comorbidity Index in a range of 2-9 (fig. 1). We did not found a significant difference between HD and DP group (Chi-square = 8.604, p = 0.282). We showed in HD group that almost a half (45%) recorded a CCI score equal with 2, 28.1% CCI score equal with 3 and 11.2% of the HD group had a CCI score of 4 (fig. 1). One possible explanation for this preponderance is that younger patients with chronic kidney disease may have a low rates of multiple comorbid conditions. In DP group the highest CCI score registrated was 4. We identified that the more chronic diseases the patient had, the more likely he/she was to have poor HRQOL scores (tab. 2). In HD group high CCI scores recorded a significant negative impact on physical domaine of QoL (physical functioning and role due too physical functioning), VT, BP and MH (tab. 3, fig. 2. a)-f)). Also HD group followed a significant inverse correlation between SF and GH dimensions and CCI score (tab. 3, fig. 2 a)-f). The best values of PF item were recorded in group of patients with CCI score 2 (62.10 ± 35.08), respectively 3 (53.45 ± 37.47); Similar trend was identified by VT and BP dimensions with CCI. PD group showed a non-systematic variations of SF 36 domaines, so the statistical analysis did not return faithful results (fig. 3 a) – c)). In terms of prognosis, Van Manen and colleagues acknowledged in a large Dutch prospective multicenter study (Netherlands Co-operative Study on the Adequacy of Dialysis-2), which included 1205 new patients with ESRD, that Charlson index had the best discriminating features with a concordance c statistic of 0.71. Di Iorio et al. reported that the crude mortality rate increased by approximately 60% of patient-years across incident hemodialysis patients when the CCI score was 3 in contrast to when the CCI score was 6. They also found that in addition to CCI, days of hospitalization were an important independent predictor of mortality. Rattanas ompattikul et al. found in a 6 years cohort of 893 maintenance HD patients that the mCCI (without the criteria of age) is still a strong predictor factor of mortality.

CONCLUSIONS

Even if we underestimated the prevalence of comorbidities, the CCI system provided a good predictive value. The CCI scores recorded a significant negative impact on QoL in patients undergoing maintenance HD. There is very limited data in this aspect in our PD patients, so a multicentric study must be performed to assess the comorbid condition and QoL among this group of patients.

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