Dementia and Depression in End Stage Renal Disease: Comparison between Hemodialysis and Continuous Ambulatory Peritoneal Dialysis

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Objectives: *To determine the prevalence, risk factors of dementia and depression in end stage renal disease (ESRD) who were treated with hemodialysis (HD) compared with those who had continuous ambulatory peritoneal dialysis (CAPD).*

Material and Method: *A cross-sectional study was conducted on 90 ESRD patients (60 HD and 30 CAPD groups). The authors reviewed the demographic data, investigation results. Thai Mental State Examination, DSM IV criteria and Thai Depression Inventory were interviewed to determine dementia and depression respectively.*

Results: *Both prevalence of dementia and depression in ESRD on continuous dialysis were 6.7 %. In the HD group had 8.3% prevalence of dementia and 6.7% of depression, whereas there was 3.3% of dementia and 6.7% of depression in the CAPD group. The severity of depression in the present study was mild to moderate (6.7%) and no major depression was seen. The significant risk factors for dementia were age $\geq$ 60 years (p=0.003), Education $<$ 10 years (p=0.037) and female sex (p=0.036). The significant risk factor for depression was female sex (p=0.036). There was no significance different on prevalence of dementia and depression comparison between the HD and CAPD group.*

Conclusion: *Prevalence of dementia and depression in the overall dialysis in ESRD was 6.7% (with 8.3%, 6.7% among the HD group and 3.3%, 6.7% among CAPD group). There was no significant difference on prevalence of dementia and depression comparison between the HD and CAPD group.*

Keywords: *End stage renal disease, Hemodialysis, CAPD peritoneal dialysis, Dementia, Depression*

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Dementia is a common condition among elderly and chronic illness including chronic renal disease[1-6]. Recently, mean population age has gradually increased due to advanced medical care so demented patients will increase in prevalence. Dementia can produce many problems such as

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disturbance in activity of daily living. However, some dementias are reversible and early detection and treatment are better[7-10]. The well-known screening test for dementia detection in Thailand includes Mini-Mental State Examination (MMSE), Thai-Mental State Examination (TMSE), Chula Mental Test [11-14]. Clinical criteria for dementia diagnosis is based on DSM IV[15]. TMSE is easy, convenient and fast. It has a standard cut off point for dementia screening (< 24 /30). TMSE can be tested by trained non-medical personal contrast to clinical criteria from DSM IV necessary evaluated by medical personel.

Depression is a common mood disorder in chronic illness especially in ESRD[16,17]. This condition has a burden on the quality of life. Early diagnosis and treatment is also important[18-20]. The screening test that the authors prefer is the Thai depression inventory (TDI) because this questionnaire is easy, adjusted to Thai culture and uses the Thai language. It already has a cut off point to diagnose and classify by severity[21].

ESRD is a condition with severe irreversible kidney function. There are systemic waste products and can produce various neurological symptoms. Although the patients can be treated by renal replacement therapies [hemodialysis (HD) or continuous ambulatory peritoneal dialysis (CAPD)]. However, abnormal symptoms still occur such as dialysis dementia, dialysis disequilibrium, encephalopathy. The objective of the present study was to compare the frequency of dementia and depression between patients who received HD and CAPD and assess risk factors of this condition. This data may be used for selection of the mode of dialysis and avoid or prevent risk factors of dementia and depression Thai ESRD patients in the future.

Material and Method

A cross-sectional study was conducted on 90 ESRD patients from September, 2003 to August, 2004. The authors enrolled ESRD patients who had been treated with continuous dialysis for more than 3 months in the hemodialysis unit and CAPD clinic of Phramongkutklao Hospital. The authors reviewed and recorded demographic data of all patients by questionnaire. Thai Mental Status Examination (TMSE) was tested and the patients were interviewed by a well-trained neurologist to determine dementia and Thai Depression Inventory (TDI) was used to determine depression. TMSE is a cognitive assessment battery that was developed by Thai multi-centers neurologists. TMSE is very easy, takes a short time to test and has a cut off point for dementia diagnosis (of less than 24 from 30 scores). The authors also did a pilot study in 28 ESRD to validate the TMSE cut off point 24 compared with clinical diagnosis of dementia by using DSMIV criteria and found significant agreement for dementia diagnosis (p=0.013). TDI is a self-rating instrument that has good validation with the standard instrument for depression. The TDI score range 0-60. The range of score was 0-20, 21-25, 26-34, 35-40 and 41-60 mean no, mild, moderate, major and severe major depression respectively. The present study was approved by the ethical committee.

Statistical Analysis

Statistical analysis was done by using the statistical software package (SPSS) for windows version 11.5. The data were described in mean and standard deviation (SD) or percent (%). Chi Square, Fisher's exact test and t-test were used for determining difference. P value < 0.05 was statistically significantly different.

Table 1. Demographic characteristics of ESRD patients with continuous dialysis

Profile	HD (n = 60) N (%)	CAPD (n = 30) N (%)	p
Sex male	33 (55 %)	21 (70 %)	0.127
female	27 (45 %)	9 (30 %)	
Age (year)	53.67 ± 15.84 (23-87 years)	55.67 ± 14.18 (32-81 years)	0.561
Education (years)	9.98 ± 4.67 (0-20 years)	11.13 ± 4.83 (0-16 years)	0.279
Income (bath/month)	5,000-10,000	10,000 - 15,000	0.831
DM	12 (20 %)	10 (33.3 %)	0.13
HT	57 (95 %)	25 (83.3 %)	0.78
Duration of dialysis (month)	68.48 ± 34.04 (4-140)	36.67 ± 30.62 (5-111)	< 0.001*
BUN (mmol/L)	22.15 ± 6.67 (11.9-48)	15.89 ± 5.6 (7-28)	< 0.001*
Creatinine (mmol/L)	942.68 ± 245.6 (454-1,535)	954.75 ± 420.1 (376-1,946)	0.864
Albumin (g/L)	3.94 ± 0.34 (2.9-4.6)	3.76 ± 0.27 (3.3-4.2)	0.013*
Hematocrit (%)	32.35 ± 5.7 (24.8-45.7)	34.55 ± 5.13 (17.9-47)	0.078

N = number, ESRD = end state renal disease, * p-value < 0.05, DM = diabetes mellitus, HT = hypertension, HD = hemodialysis, CAPD = continuous ambulatory peritoneal dialysis, BUN = blood urea nitrogen, SD = standard deviation

Table 2. TMSE score in HD and CAPD group

TMSE	HD (n = 60) N (%)	CAPD (n = 30) N (%)	p
TMSE score	26.73 ± 2.43 (18-30)	27.4 ± 2.18 (20-30)	0.207
TMSE < 24	5(8.3 %)	1 (3.3%)	
TMSE 24 - 30	55 (91.7%)	29 (96.7%)	0.659[a]

TMSE = Thai mental state examination

[a]by 2-sided Fisher's Exact test

Table 3. Thai Depression Inventory score in HD and CAPD group

Depression	HD (n = 60) N (%)	CAPD (n = 30) N (%)	p
Depression score	12.77 ± 5.21 (4-28)	12.27 ± 10.00 (3-33)	0.698
No depression (score 0-20)	56 (93.3 %)	28 (93.3 %)	1.00[a]
Depression	4 (6.7 %)	2 (6.7 %)	
Mild depression (score 21-25)	2 (3.35 %)	0 (0 %)	
Less than major depression (score 26-34)	2 (3.35 %)	2 (6.7 %)	
Major depression (score 35-40)	0 (0 %)	0 (0 %)	
Severe major depression (score 41-60)	0 (0 %)	0 (0 %)	

[a]by 2-sided Fisher's Exact test

Results

Of the 90 dialyzed patients, there were 54 males (60 %) and 36 females (40 %). Mean age was 55 ± 16.1 years, in the range of 23-87 years. The common underlying diseases 91% were hypertension (HT) and 22.2% were diabetes mellitus (DM). The authors enrolled 90 HD and 30 CAPD patients to the present study. Demographic characteristics of the patients are shown in Table1.

The mean age of both groups was not different [HD (53.67 years) and CAPD (55.67 years)]. The male to female ratio was 1.2 : 1 in HD and 2.3 : 1 in CAPD with no significant difference (p=0.127). The duration of dialysis in HD was significantly higher than CAPD (68.48 months versus 36.67 months, p-value <0.001). Mean BUN in the group of HD was 22.15 mmol/L higher than CAPD 15.89 mmol/L with p-value <0.001. Mean serum albumin level in the group of HD was 3.94 g/L higher than CAPD 3.76 g/L with p-value 0.013. Mean creatinine and hematocrit of both groups were not different.

Overall (90 patients), the patients who were suspected of dementia (TMSE < 24) were 6 cases (6.7%) and depression (TDI score > 20) were 6 cases (6.7%). The detail of TMSE and TDI were shown in Table 2 and 3. Mean ± SD of TMSE score in the HD group was 26.73 ± 2.43 and in the CAPD group was 27.4 ± 2.18. HD patients who had TMSE < 24 was 5 cases (8.3 %) that were not significantly different when compared with CAPD (1 case, 3.3%) p-value = 0.659. By Fisher's exact test, the significant risk factors for dementia in the present trial were age more than 60 years (p=0.003), education less than 10 years (p=0.037) and female sex (p=0.036).

Mean TDI score of the HD group was 12.77 ± 5.21 and the CAPD group was 12.27 ± 10. There were 2 cases of mild depression (score 21-25) and 4 cases of less than major depression (score 26-34) but no case of major and severe major depression. There were 4 depression cases (6.7%) in HD and there were 2 cases (6.7%) of depression in the CAPD group that had no statistically significant difference (p-value = 1.00). By Fisher's exact test, the significant risk factors for depression in the present trial was female sex (p=0.036).

Discussion

ESRD is an important condition in clinical practice. The modern medical technique improved the mean age of the patients and increased in annual incident every year. The quality of life of chronic illness is usually poor especially in ESRD. The two important conditions that influence the quality of life in the chronic illness conditions are dementia and depression. In the present study, the authors assessed dementia and depression in ESRD who were treated with continuous dialysis 90 cases by using TMSE and TDI respectively. The authors validated the diagnosis agreement clinical diagnosis by DSMIV criteria and the cut off point of 24 of TMSE in the ESRD study group and the authors found it can be appropriately used as a screening test in ESRD.

Of 90 ESRD patients, the authors found 6.7% dementia patients that was not more than the general population prevalence of dementia in Thailand (1.8-16.5%) [4,22,23]. Some risk factors of dementia in ESRD were similar to the general population. The mode of dialysis was not a risk factor for dementia that was found in the HD group 8.3% compared with the CAPD group 3.3%. The significantly different demographic data were higher level of BUN, albumin and longer duration of hemodialysis in the HD than the CAPD group that might have affected the neuropsychiatric symptoms. However, after analysis of covariance, BUN, albumin and duration of dialysis were not significant risk factor of dementia. The prevalence of depression in the Thai general population was 7.27%-

19.9%[24,25]. The prevalence of depression in the present study was 6.7% that was not more than the general population[17,22]. The prevalence of depression in patients who received hemodialysis for more than 6 months in other series was 12.78-55%[17,23,26-29]. Female sex was a risk factor of depression in the present study group. Some cases of dementia also showed depression, so the authors should be aware about pseudodementia condition. According to the small sample size and very low demented and depressed patients in the present trial, multivariate analysis could not be done. A more accurate risk factor study should be further done in a larger trial for use as a guide in the selection of the mode of dialysis.

Conclusion

There were 6.7% dementia and 6.7% depression cases in ESRD with continuous dialysis. The prevalence of dementia and depression in HD was 8.3 % and 6.7% respectively. The prevalence of dementia and depression in CAPD was 3.3% and 6.7% respectively. No major depression was found in the present study. Risk factors of dementia in ESRD with dialysis were age > 60 years, female, and education < 10 years. The risk factor of depression was female sex. The authors used TMSE (cut off point 24) to determine dementia in ESRD.

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ภาวะสมองเสื่อมและภาวะซึมเศร้าในผู้ป่วยไตวายเรื้อรังระยะสุดท้าย: การเปรียบเทียบระหว่างกลุ่มที่ได้รับการรักษาด้วยการฟอกเลือด และล้างทางช่องท้อง

พาสิริ สิทธินามสุวรรณ, สุชาดา นิยะสม, สามารถ นิธินันทน์, อุปถัมภ์ ศุภสินธุ์

วัตถุประสงค์: *เพื่อหาความชุกและปัจจัยเสี่ยงภาวะสมองเสื่อมและภาวะซึมเศร้า เปรียบเทียบระหว่างกลุ่มฟอกเลือด และล้างทางช่องท้อง เพื่อนำไปใช้เป็นแนวทางในการเลือกการรักษา*

วัสดุและวิธีการ: *เป็นการศึกษาแบบพรรณนาแบบตัดขวาง ทำการศึกษาโดยรวบรวมข้อมูลพื้นฐาน, ผลการตรวจทางห้องปฏิบัติการ, ทำการทดสอบ Thai Mental State Examination และประเมินการวินิจฉัยทางคลินิกโดยเกณฑ์ของ DSM IV เพื่อค้นหาภาวะสมองเสื่อม และให้ผู้ป่วยทำแบบสอบถามเรื่องภาวะซึมเศร้าโดยใช้ Thai Depression Inventory ในผู้ป่วยที่ฟอกเลือด 60 คน และล้างทางช่องท้อง 30 คน*

ผลการศึกษา: *ผู้ป่วยโรคไตวายเรื้อรังระยะสุดท้ายที่ล้างไตสม่ำเสมอพบอัตราการเกิดภาวะสมองเสื่อมร้อยละ 6.7 และภาวะซึมเศร้าร้อยละ 6.7 ผู้ป่วยที่ฟอกเลือด พบอัตราการเกิดภาวะสมองเสื่อมร้อยละ 8.3 และภาวะซึมเศร้าร้อยละ 6.7 ในกลุ่มล้างทางช่องท้องพบอัตราการเกิดภาวะสมองเสื่อมร้อยละ 3.3 และภาวะซึมเศร้าร้อยละ 6.7 พบปัจจัยที่มีความสัมพันธ์กับการเกิดสมองเสื่อมอย่างมีนัยสำคัญทางสถิติคือ อายุมากกว่า 60 ปี (p=0.003), เพศหญิง (p=0.036) และการศึกษาน้อยกว่า 10 ปี (p=0.037) ความรุนแรงของภาวะซึมเศร้าอยู่ในระดับเล็กน้อยถึงปานกลาง (ร้อยละ 6.7) ไม่พบระดับความรุนแรงชนิด major depression และพบความสัมพันธ์ของภาวะซึมเศร้ากับเพศหญิง (p=0.036)*

สรุป: *ความชุกของภาวะสมองเสื่อมและซึมเศร้าในผู้ป่วยโรคไตวายระยะสุดท้ายที่ได้รับการรักษาล้างไตสม่ำเสมอโดยรวม คือร้อยละ 6.7% ความชุกของภาวะสมองเสื่อมและซึมเศร้าเฉพาะกลุ่มทำการฟอกเลือดร้อยละ 8.3% และ 6.7% ตามลำดับ และความชุกของภาวะสมองเสื่อมและซึมเศร้าเฉพาะกลุ่มล้างทางช่องท้องร้อยละ 3.3% และ 6.7% ตามลำดับ ผู้ป่วยกลุ่มฟอกเลือดและล้างทางช่องท้องพบการเกิดภาวะสมองเสื่อมและภาวะซึมเศร้าไม่แตกต่างกัน*