

Original article

Comparative study of impact of hemodialysis and renal transplantation on cognitive functions in ESRD patients

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ABSTRACT

Cognitive impairment is defined as a newly appeared deficit in at least two areas of cognitive functions, including disturbances in memory, executive functioning, attention or speed of information processing, perceptual motor abilities, or language. Cognitive impairment is highly prevalent in ESRD patients when compared with the general population. It has also been associated with a decreased quality of life. Cognitive functions in patients with ESRD showed improvement with dialysis and renal transplantation. These findings illustrate the potential importance of evaluating and comparing the effects of hemodialysis and transplantation regarding cognitive performance and thus quality of life in ESRD patients and normal subjects. This study was carried out in 100 patients (50 ESRD patients on regular hemodialysis for at least 6 months and 50 post-transplant patients who had maintained successful kidney graft for at least 3 months). All patients underwent laboratory and psychometric scoring tests, including trail making test part A, trail making test part B, digit span, and mini-mental state examination. Thirty healthy adults matched by age and sex served as a control group. The results showed significant differences in cognitive function tests results between transplant and hemodialysis patients ($P < 0.01$), suggesting that transplant patients were superior in their cognitive performance, with the correction of anemia being the most important factor for improving cognitive performance in both groups. There were no significant differences between transplant patients and control subjects in psychometric measures ($P > 0.05$).

Conclusion: Renal transplantation as a modality of treatment, in ESRD patients, is superior to hemodialysis in terms of cognitive performance improvement.

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Estudio comparativo de la influencia de la hemodiálisis y el trasplante renal en la función cognitiva de los pacientes con enfermedad renal terminal

R E S U M E N

Palabras clave:

Hemodiálisis

Trasplante

Función cognitiva

El deterioro cognitivo se define como un déficit de nueva aparición en al menos dos áreas de las funciones cognitivas, incluidas las alteraciones de la memoria, la función ejecutiva, la atención o la rapidez de procesamiento de la información, las capacidades motoras perceptivas o el lenguaje. El deterioro cognitivo tiene una prevalencia elevada en los pacientes con ERT en comparación con la población general. También se ha asociado a una reducción de la calidad de vida. Las funciones cognitivas de los pacientes con ERT mostraron una mejoría con la diálisis y con el trasplante renal. Estas observaciones ilustran la posible importancia de la evaluación y comparación de los efectos de la hemodiálisis y el trasplante sobre la función cognitiva y, por tanto, sobre la calidad de vida, en relación con los pacientes con ERT y los individuos normales. El estudio se llevó a cabo en un total de 100 pacientes (50 pacientes con ERT en hemodiálisis regular durante un mínimo de 6 meses y 50 pacientes trasplantados que habían mantenido un buen funcionamiento del injerto renal durante un mínimo de 3 meses). En todos los casos se realizaron análisis de laboratorio y tests psicométricos como el test del trazo (trail making test) parte A, el test del trazo parte B, el test de memoria inmediata de números (digit span) y la mini mental state examination, y se compararon con los de 30 adultos sanos igualados en cuanto a edad y sexo, que se utilizaron como grupo de control. Los resultados pusieron de manifiesto diferencias significativas en los tests de función cognitiva entre los pacientes trasplantados y los hemodializados ($p < 0,01$), y sugirieron que los pacientes trasplantados obtenían mejores resultados de función cognitiva y que la corrección de la anemia era el factor más importante en esa mejora en ambos grupos. No hubo diferencias significativas entre los pacientes trasplantados y los individuos de control por lo que respecta a los parámetros psicométricos ($p > 0,05$).

Conclusión: El trasplante renal como modalidad de tratamiento, en los pacientes con ERT, es superior a la hemodiálisis por lo que respecta a la mejora de la función cognitiva.

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Introduction

Cognitive impairment is defined as a new deficit in at least two areas of cognitive functioning. These may include disturbances in memory (learning or recalling new information), executive functioning (e.g., planning, reasoning), attention or speed of information processing (e.g., concentration, rapidity of assimilating or analyzing information), perceptual motor abilities (e.g., integrating visual, tactile, or auditory information with motor activities), or language (e.g., word-finding difficulties, reduced fluency).¹ Cognitive impairment is a well-recognized manifestation of uremia.² The severity of kidney disease is associated with the severity of cognitive impairment, independent of age, education and other key confounders.³ In hemodialysis patients, the prevalence of cognitive impairment has been estimated at 30–60% at least twice the values observed in age-matched controls.⁴ Diagnosis of cognitive impairment is important as cognitive impairment and dementia are associated with an increased risk of death in dialysis patients.¹ Recent data in this regard suggest that individuals at all stages of CKD may have a higher risk of developing dementia and cognitive impairment than those without CKD.⁴ Cognitive function in patients with

ESRD has improved with renal transplantation.² Studies on outcomes after transplantation have traditionally measured post-operative survival and complication rates. One area that has received less attention is the impact of dialysis and transplantation on neuropsychological functioning.⁵

Materials and methods

This cross-sectional design study was conducted on (100) Egyptian patients as well as (30) healthy subjects (control group) matched as regards age, sex and education. The patients were classified into two groups. Group I: Included (50) ESRD patients on regular hemodialysis, thrice weekly, 4h for each session. All patients were on regular HD for at least 6 months. This interval was to ensure enough time for maintenance HD to correct and avoid uremic complications. Group II: Included (50) post renal transplantation patients who had maintained successful kidney graft for at least 3 months duration. This interval was to ensure some distance from potential early post-operative complications and to allow some time for adjustment of the transplant and immunosuppressive regimen. We excluded from the study patients with evident cerebrovascular disease, thyroid disease, severe

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