

Brief Communication

Combination of Oral Activated Charcoal Plus Low Protein Diet as a New Alternative for Handling in the Old End-Stage Renal Disease Patients

C.G. Musso¹, H. Michelangelo², J. Reynaldi¹, B. Martinez², F. Vidal², M. Quevedo², M. Parot², G. Waisman², L. Algranati¹

¹Nephrology and ²Internal Medicine Divisions, Hospital Italiano de Buenos Aires, Argentina

ABSTRACT. Chronic dialysis is a valid therapeutic option in very elderly ESRD patients, even though the decision to dialyze or not has little impact on survival. Additionally, very old patients usually do not agree with starting chronic dialysis. Even though, activated charcoal is a cheap treatment for working as adsorbent for nitrogenous products its utility is very limited. We studied the combination of a low protein diet and oral activated charcoal to reduce serum urea and creatinine levels in very old ESRD patients who had refused to start chronic dialysis. Nine lucid, very old > 80 years, ESRD patients who had refused to start dialysis were prescribed a treatment based on a combination of a very low protein diet and oral activated charcoal (30 gram/day). None of the patients had anuria, oliguria, edema, significant metabolic acidosis or hyperkalemia. None of them had significant gastrointestinal symptoms. After one week and ten months of charcoal use significant decrease in blood urea and creatinine levels was observed and none of them required emergency dialysis during this time. In conclusion, in patients more than 80 years of age low protein diet and oral activated charcoal may control the uremic symptoms effectively.

Introduction

Patients older than 75 have a 67 % rise in the incident rate of end-stage renal disease (ESRD) as compared to 24 % for those between 5 and 74 years. Chronic dialysis is a valid therapeutic option for senior ESRD patients, even though

Correspondence to:

Dr. Carlos G. Musso
Nephrology Division
Hospital Italiano De Buenos Aires,
Argentina
E-mail: carlosmusso@gmail.com

the survival for octogenarians on dialysis is far lower than age-matched general population. Additionally, very old patients usually disagree with starting chronic dialysis when offered.¹⁻³

Conservative treatments for ESRD have already been described. Caloric diet enriched with essential ketoacids and reduced protein intake is one of the options though expensive. The other therapeutic alternative is represented by oral preparations acting as nitrogenous waste product (urea, etc) sorbents such as activated charcoal. Even though, activated charcoal is cheap, its ability to reduce nitrogenous products is very limited.⁴⁻⁶

Table 1. Serum urea and creatinine levels before and after activated charcoal treatment

	Before charcoal	After 1 week	P	After 10 months	P
Serum urea (mg/dL)	135 ± 66	89 ± 36	0.01	91 ± 39	0.008
Serum creatinine (mg/dL)	3.5 ± 0.9	3.0 ± 1.1	0.03	3.0 ± 1.3	0.08

Metabolism is also markedly diminished in very old people, and consequently their nutritional requirements as well as their nitrogenous waste products production are considerably reduced. We therefore decided to evaluate if a combination of a low protein diet (0.8 g/kg/day) and oral activated charcoal could significantly reduce serum urea and creatinine levels in very old ESRD patients who had refused to start chronic dialysis

Material and Method

Nine lucid, very old patients; mean age 84 year (80-90yrs), ESRD (stage V: GFR 11 mL/min) and had refused to start dialysis, were proposed to initiate a treatment based on a combination of a low protein diet and oral activated charcoal: 30 gram/day (15 grams bid). None of the studied patients had oliguria, significant metabolic acidosis, edema, hyponatremia, or hyperkalemia. No significant gastrointestinal contraindication existed for activated charcoal intake. Charcoal was given far from patients' medication intake time although they were not on any medications that could have caused interference with its absorption.

All patients were trained for peritoneal dialysis just in case they changed their mind regarding starting dialysis, as well as they signed an informed consent for charcoal treatment. Monthly laboratory investigations included: serum urea, creatinine, electrolytes, albumin, cholesterol, and acid-base status. Statistical analysis was performed applying Wilcoxon test (SPSS, Chicago, Illinois, USA).

Results

In the present study a significant reduction in serum creatinine and urea levels were documented after one week of oral activated charcoal treatment, similarly after a mean period of

10 months significant reduction was noted in serum urea levels and a trend in serum creatinine levels (Table 1).

Three patients developed uremic symptoms after 7 months of activated charcoal treatment, and while two of them finally accepted to start dialysis, the other patient refused it.

No significant changes in neither their nutritional parameters (weight, albumin and cholesterol) nor in their daily activity geriatric scores were noted during the whole study (data not shown here). All patients remained non oliguric and no significant changes in biochemical profile were noted. The only adverse effect documented was mild constipation in one patient which responded to oral laxative.

Discussion

Charcoal is activated by exposing it to oxidizing gas compound at high temperatures resulting in the production of increased surface area from the creation of pores. A 50 grams dose of activated charcoal has a surface approximately equal to 10 football fields. Urea and other waste products which diffuse into the gastrointestinal tract from the blood are bound to charcoal and excreted in the feces, creating a concentration gradient for continued diffusion, giving place to a process called "intestinal dialysis".⁷ Although it has minimal adverse effects besides reported vomiting, acute appendicitis, allergic reaction, and luminal drug adsorption: carbamazepine, digoxine, furosemide, mycophenolate, theophylline, and olanzapine.⁸

In this study, we documented a significant reductions in serum urea level in end-stage renal disease very old patients who refused dialysis. We were also able to maintain fair metabolic and clinical profile during this long term follow up. This might help the nephrologists to buy time for ultimately convincing the octogenarians who have ESRD to dialyze but are

otherwise in good shape.

In conclusion, it seems that activated charcoal plus a low protein diet could be a useful therapeutic alternative in order to handle end-stage renal disease in very old patients who had refused dialysis, not only because of its impact in serum urea reduction but also for providing the opportunity to the patient for re-thinking about their dialysis refusal.

References

1. Misra M. Dialysis in the elderly. *Blood Purif* 2008;26:41-4.
2. Cook W, Jassal V. Prevalence of fall among seniors maintained on hemodialysis. *Int Urol Nephrol* 2005;37:649-52.
3. Kurella M, Covinsky K, Collins A, Chertow G. Octogenarians and nonagenarians starting dialysis in the United States. *Ann Intern Med* 2007;146:177-83.
4. Brunori G, Viola B, Maiorca P, Cancarini G. How to manage elderly patients with chronic renal failure: conservative management versus dialysis. *Blood Purif* 2008;26:36-40.
5. Pendse S, Singh A. Approach to patients with chronic kidney disease, stages 1- 4: 3-13
6. Friedman E. Bowel as a kidney substitute in renal failure. *Am J Kidney Dis* 1996;28(6):943-50.
7. Charcoal. In Lacy C, Armstrong L, Goldman M, Lance L (Eds). *Drug information handbook*. Lexi-Comp. 2004:310-311
8. Micromedex Healthcare Series – Drugdex – 2008.

