Editorial

What is the Optimal Dwell Volume for CAPD Patients?

What is the optimal dwell volume in continuous ambulatory peritoneal dialysis (CAPD)? The recognized objective is to provide the greatest clearance with minimal volume-related side effects. A dwell volume of two liters has been the standard since the introduction of CAPD by Popovich et al in 1976 [1]. With the recognition of the impact of clearance on patient survival and the establishment of the National Kidney Foundation’s Dialysis Outcome Quality Initiative (DOQI) guidelines on clearance targets [2], there is an increasing trend in the Western world of using 2.5 L or even 3.0 L dwell volumes.

A study in Mexico showed that with increasing dwell volumes from 2.0 L to 2.5 L and 3.0 L, although intraperitoneal pressure and discomfort scores increased, a significant proportion of patients did not experience discomfort (64% and 44% for 2.5 L and 3.0 L dwell volumes, respectively), indicating that patients may be put on dwell volumes exceeding two liters [3]. However, Mexicans have a bigger body size than Hong Kong Chinese. The mean body surface area (BSA) of the Mexicans in that study was 1.59 m² in females and 1.79 m² in males. The mean BSA (combined gender) of Mexican patients in the ADEMEX study was 1.69 m² [4]. In the CANUSA study, the mean BSA of USA patients was 1.80 m², and that of Canadian patients was 1.74 m² [5]. Asians, particularly East and Southeast Asians, are known to have smaller body build than Caucasians. The mean BSA of the Hong Kong Chinese CAPD patients in a recently published large scale multicenter study was 1.57 m² (unpublished data) [6].

Is the 2.0 L dwell volume suitable for the smaller-sized Asians? Clinical experience in many Asian countries tells us that most patients can use the 2.0 L dwell volume without much problem. In this issue of the Hong Kong Journal of Nephrology, Danguilan et al showed that Filipinos, who have an even smaller body size, with a mean BSA of 1.50 m² to 1.53 m², can actually tolerate dwell volumes of 1.5 L and 2.0 L equally well when the CAPD was performed in a double-blinded manner [7]. No increases in discomfort scores were found with the increase in dwell volume, despite the fact that the patients had a high resistance to increasing the standard dwell volume from 1.5 L to 2.0 L. It may mean that blinding the patient during instillation of peritoneal dialysate may help to overcome resistance to increasing the dwell volume in some patients. Subjective symptoms may be modifiable and, therefore, should not prevent one from using a larger dwell volume. The abdomen is very compliant to gradual intra-abdominal volume changes. That is exactly what happens with pregnancy and obesity.

The work of Danguilan et al did not cover other side effects of increasing the dwell volume, such as the possibility of abdominal hernia development. The incidence of inguinal and umbilical hernias appears to be similar in Asians and Caucasians with 2.0-L cycle CAPD, with a reported incidence of 13.6% in Taiwan and 11.4% in the USA from two reports with similar study periods [8,9]. It is notable that hernias are surgically repairable and may not affect the technique survival rate [10]. Thus, abdominal hernia is not apparently a major barrier to the use of 2.0 L dwell volumes in most Asians.

Dialysate fluid dwell may impair gastric motility, particularly in diabetic CAPD patients and patients with a BSA less than 1.5 m² [11,12]. It may therefore affect patients’ appetite and, consequently, nutrition. Whether a smaller dwell volume would improve the situation in patients with such problems remains to be investigated.

Ultrafiltration can be variable with increasing dwell volume. The larger amount of glucose with the increase in volume may help to maintain the osmotic gradient longer for ultrafiltration, but the increase in intraperitoneal pressure may reduce ultrafiltration as a result of an increase in lymphatic absorption [13]. The influence of dwell volume on net ultrafiltration may be quite varied depending on the individual.

More work and data are required to determine the optimal dwell volume in the smaller-sized Asians, particularly regarding the effects on long-term patient outcome.

REFERENCES

3. de Jesus Ventura M, Amato D, Correa-Rotter R, Paniagua R. Relationship between fill volume, intraperitoneal pressure, body...


