

### S6 - Cost and Cost-effectiveness Analysis of Renal Replacement Therapy Modalities for Patients with End-stage Renal Disease in Hong Kong: Comparison between Peritoneal Dialysis and Haemodialysis

Cindy LAM Lo-kuen<sup>1</sup>, Carlos WONG King-ho<sup>1</sup>, Julie CHEN<sup>1,2</sup>, Samuel FUNG Ka-shun<sup>3</sup>, Irene KONG<sup>3</sup>, LO Wai-kei<sup>4</sup>, LUI Sing-leung<sup>4</sup>, CHENG Yuk-lun<sup>5</sup>, CHAN Tak-mao<sup>6</sup>

<sup>1</sup>Department of Family Medicine and Primary Care, The University of Hong Kong, Hong Kong

<sup>2</sup>Bau Institute of Medical and Health Sciences Education, The University of Hong Kong, Hong Kong

<sup>3</sup>Department of Medicine and Geriatrics, Princess Margaret Hospital, Hong Kong

<sup>4</sup>Division of Nephrology, Department of Medicine, Tung Wah Hospital, Hong Kong

<sup>5</sup>Department of Medicine, Alice Ho Miu Ling Nethersole Hospital, Hong Kong

<sup>6</sup>Division of Nephrology, Department of Medicine, The University of Hong Kong, Hong Kong

**Introduction:** Renal replacement therapy (RRT) by peritoneal dialysis (PD) or haemodialysis (HD) is a life-sustaining treatment for patients with end-stage renal disease (ESRD). According to the Hospital Authority "Peritoneal Dialysis First" policy PD is the first-line maintenance RRT for ESRD patients, but haemodialysis (HD) is preferred in many developed countries. HD can be done in the hospital or at home.

**Objectives:** 1) To estimate the local annual costs of care of ESRD in the first and second (proxy of subsequent) years of PD, hospital-based haemodialysis (HHD) and nocturnal home HD (NHD), 2) To compare the lifetime cost-effectiveness of PD, HHD and NHD.

**Methods:** A cost analysis was performed on 402 ESRD patients who were on maintenance PD (n=189), HHD (n=170) and NHD (n=43) from the healthcare provider and societal perspectives. Empirical data on healthcare utilization rates were extracted from their medical records and converted to cost based on unit costs published in the 2017 Government Gazette. We carried out a questionnaire survey on patients / caregivers' out-of-pocket costs and time spent on transportation and dialysis. Data on utility scores of ESRD patients, and annual probabilities of health state transitions, modality switching, renal transplantation, and mortality were identified from published data. Lifetime cost-effectiveness analyses (CEA) by Markov modelling were performed based on empirical annual costs and published outcome data to estimate lifetime costs, quality-adjusted life-years (QALYs) and cost-effectiveness of PD, HHD and NHD.

**Results:** HHD had the highest annual costs from both healthcare provider / societal perspectives in the initial year (HHD=USD\$51,289 / \$57,968; PD=USD\$15,188 / \$24,255; NHD=USD\$28,636 / \$31,031; P<0.001) and second year (HHD=USD\$46,272 / \$52,951; PD=USD\$10,358/\$19,426; NHD=USD\$11,157 / \$13,552; P<0.001). Lifetime CEA showed that HHD (lifetime cost USD\$148,083; 7.14 QALYs) was dominated by PD (USD\$78,920; 7.32 QALYs). From the healthcare provider perspective, NHD had the highest effectiveness (13.68 QALYs), but at a higher lifetime cost (USD\$155,318) than PD. The incremental cost-effectiveness ratio (ICER) was USD\$12,020 per QALY gained for NHD over PD. From the societal perspective, the ICER was USD\$10,357 per QALY gained for NHD over PD. Both ICERs fell within generally acceptable CE thresholds. Sensitivity analysis showed that all model parameters had minimal impact on ICER values.

**Conclusions:** PD was cost-saving relative to HHD as the first-line RRT and NHD was a cost-effective alternative to PD. The findings support the "Peritoneal Dialysis First" policy as maintenance RRT for ESRD patients in Hong Kong. NHD can be recommended as the first-line maintenance RRT for patients whose conditions are suitable.

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