



The use of dialysis nurse specialist in a Chinese haemodialysis unit can be safe and cost effective

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I : Introduction

The HKU-SZH is a public hospital located in the Municipal city of Shenzhen and is a new joint adventure hospital owned by the Shenzhen City and managed by the University of Hong Kong. At the time of the study, there were 24 haemodialysis (HD) stations operating three shifts three days a week, and two shifts three days a week with two full time doctors on site. The Chinese Dialysis SOP indicates that at least one senior dialysis doctor must be present continuously in a HD unit to take charge. If the number of HD stations exceed 20, more doctors are added to match the station number. The doctor in charge must complete an evaluation and write out a dialysis prescription each time. This is contrary to the practice in Hong Kong and the U.K. where the nurses are trained to deliver most of the day-to-day care of dialysis patients; the doctors only review the patients when it is needed in the unit. We decided to probe whether we could draw the best out of the Western and the Chinese models and to put together for our use.

II : Method

All chronic HD patients in the daytime shifts and who have been dialyzing more than two months were targeted for the study. The study had received approval given by the local Hospital Research and Ethics Committee. Patients deemed "stable" based on their health evaluation and complexity of dialysis prescription over the preceding 2 months were invited to participate. A total of 50 consecutive HD patients were consented. For the first two-month period, the senior doctor in the dialysis unit would make out the dialysis prescription each time. For the second 2-month period, the designated nurses were given the responsibility to assess stable patients to determine the blood flow (BF) rate and ultrafiltration (UF) rate. The cost saving resulted from shifting routine duties from dialysis doctors to nurses was monitored, assessed and estimated.

Four designated dialysis nurses with at least 5 years' dialysis experience each were responsible for assessing the 50 patients, taking into consideration the patients' blood pressure, weight gain, symptoms, oedema and the state of the A-V fistula. As a rule, a BF rate of 250 to 300 ml/ minute was usually obtained. The dry weight was adjusted progressively by reducing it by 0.5 kg per week if the pre-dialysis BP > 160/ 90 mmHg. Each nurse was in charge of 4-6 patients at any one time. All adverse events occurring during dialysis were recorded. Serious adverse event must be reported to the doctors.

III : Results

The mean age of the 50 patients were 45.8 (26-69) with a M:F of 7:3. The most common causes of kidney failure were chronic nephritis (not biopsied, 22), chronic glomerulonephritis (12), diabetes (6), polycystic kidney disease (4), obstructive uropathy (2), medullary sponge kidney (1), renal stone (1), renal T.B. (1), hereditary kidney disease (1). The average Charlson Comorbidity Index Score was 2.8 (2-6). 46 out of the 50 patients were receiving HD or Haemodiafiltration or HDF (Braun), using a high flux dialyzer, 4 hours (h) thrice weekly. Two patients were undergoing 5 sessions of 4 h treatment divided between 2 weeks. Two patients received HD 4 h and 3.5 h twice a week respectively. The mean standardized Kt/V of the group was 1.68 (1.03-2.32).

During the 4-month period, a total of 2,478 HD sessions were carried out. Some of the common adverse effects including the episodes of intra-dialytic hypotension, before and after the change of practice were recorded as shown in Table 1.

	period-1	period-2
Total number of sessions	1235	1242
Increased heart rate	19	39
BP fall > 20 mmHg with symptoms	38	38
Headache	15	5
nausea	2	2
Bleeding	9	3
hypoglycaemia	1	2
Thrombosed AV fistula	0	0
Total adverse events	84	89

Table 1 adverse event during HD sessions in the two periods of study

There were no serious adverse events during the two study periods. There were a few more bleeding episodes and headache in the first 2-month period. The bleeding was not significant; all of these resolved after reducing the heparin dose. The headache had occurred in different patients with no specific causes. There were no differences in the episodes of intra-dialytic hypotension in the two periods even though there were notably more episodes where the heart rate exceeded 110 bpm in the second 2-month. In one patient, the pulse exceeded 110 at the end of the dialysis 8 times, and which responded to an increase in dry weight. At the end of the study, all patients showed satisfaction with the change.

IV : Discussions

As shown by the China DOPPS (Dialysis Outcomes and Practice Pattern Studies), Chinese HD patients are younger (59 year-old) with less co-morbid in the urban cities compared to the West. Shenzhen is an immigrant and youthful city. The average age of our patients was 45.8 year, with a mean Charlson score of 2.8.

a) Safety and Acceptance

We have been able to show that in an urban city like Shenzhen with younger HD patients and lower co-morbid, it is possible to delegate more responsibility to the dialysis nurses within a well-structured HD unit with clear governance about roles and accountability. The efficiency and cost effectiveness of treatment have been increased; and pressure on doctors be alleviated while patients' safety has been maintained.

b) Cost Implications

By shifting some of the routine operation from doctors to dialysis nurses, we had utilized the spared resources better and more effectively. It was estimated that each doctor would take some 20 minutes to complete a dialysis prescription. If so, our pilot scheme would have saved 1,242 prescriptions (carried out in the second 2-month) x 0.3 hours doctors' time, equivalent to 2,236 hours in 12 months while no extra nurses were required. The patients were benefitted too because they waited less time to go onto the HD machine; their dialysis experience improved; and relevant cost reduced.

c) Learning points

For the above model to be successful, it is essential to educate doctors, nurses and patients so that better allocation and division of duties and labour between the doctors and nurses could be worked out and accepted by all stakeholders. Ultimately, the success and failure of the scheme and the assurance of its safety are tied up and hinged on the correct ratio and skill mix of nurses, adequate training and supervision, and clear governance on monitoring, checking, reporting, action and audit.

d) UK Practices

In the U.K. model, it has been recommended for a typical hospital main centre dialysis unit with 18 HD stations operating three patient shifts to bear a patient to staff ratio of 3:1, with 70:30 registered to unregistered nurses, a skill mix of roughly 1 senior nurse : 3 intermediate nurse : 1 newly qualified nurse : 1 health care assistant; and for a minimal care unit, a ratio of 4:1 and 50:50 registered to unregistered nurses.

V : Conclusion

The number of Chinese dialysis patients is increasing progressively. Our pilot scheme may serve as a new health model for HD in China that may save scarce and precious medical human power and public funds. In the process, hopefully the country, the hospitals and the patients will all be better off, making it a 3-win scheme and program.

VI : Acknowledgement

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