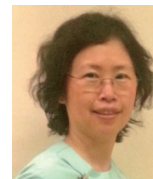


‘Doctor, how long can my mother live on dialysis?’



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End-stage renal disease (ESRD) is prevalent in Hong Kong. In the year ending 2011, there were 1115 newly diagnosed ESRD patients admitted to the Hospital Authority renal replacement program. The disease incidence was 157 patients per million population. [1] The decision to undergo long-term dialysis is a stressful, if not traumatic, one for the patients and their relatives, especially they have to face the future with so many unknowns. When a patient was told that she had ESRD requiring dialysis, many relatives would bring her to see another doctor for a second opinion with the opening question, ‘doctor, how long can my mother live on dialysis?’

Such scenarios occur in the rooms of the nephrologists as well as family doctors. The question might appear stupid on first thought. The patient is usually an elderly with multiple co-morbidities. It is inherently difficult to give an accurate life expectancy of *any* person, let alone an ESRD patient with complicated medical history. Some doctors jokingly replied that he did not even know how long *he* himself would survive, let alone a frail patient with ESRD.

Such jokes were out of place, especially in front of a patient under stress. Discussion with the patient and her family on the prognosis and the end-of-life care is one of the duties of a physician. Long term dialysis treatment is a major undertaking with great financial and social implications to the patient and the family. They need to know various aspects of each treatment modality including the risk, benefits and the cost of treatment. The life expectancy is also an important factor in their consideration. If the patient’s life expectancy is ‘too short’ (e.g. for a few weeks), they might consider adopting palliative treatment alone. On the other hand, if a patient is expected to live for decades on dialysis, they would need to assess their financial capability in supporting the patient on private dialysis for such a long term. The doctor needs to give some data to the patients for them to make an individualized decision.

Making a general estimate of life expectancy is not impossible. Over half of the patient with ESRD in Hong Kong suffered from diabetic nephropathy. Not long ago, it was widely believed that if a diabetic patient develops ESRD, the life expectancy is around two years even with dialysis. Diabetes itself is a cardiovascular equivalent, ie, the chance of a diabetic patient developing cardiovascular event is the same as those with previous myocardial infarction. Recently, it was held that ESRD is also a cardiovascular equivalent. In general, ESRD patients have a high chance of developing a cardiovascular event or stroke and died from it. **Renal patients usually die of stroke or cardiac events rather than from uraemia.**

The situation is not as gloomy now, thanks to the advances in the understanding of the disease. Even as ESRD patients are more prone to cardiovascular events, measure such as good control of blood pressure would help to reduce the risk. Other factors such as the correction of anaemia and treatment of renal secondary hyperparathyroidism would also help. Anaemia is potent risk factor for development of left ventricular hypertrophy and renal hyperparathyroidism is a strong risk factor for coronary events. **It is now known that one of the major mortality factors in renal patients is malnutrition.** A patient with serum albumin of less than 30 g/l has a much higher mortality. Infusion of albumin would not improve the prognosis, but various measures to encourage the dietary protein intake would help.

In an attempt to achieve a more specific prognostic estimate, Cohen et al in 2010 studied the 6-month mortality of patients on haemodialysis [2] and found that it has strong co-relation with the following questions:

1. Would I be surprised if my patient died in the next 6 months?
2. What is the serum albumin?
3. What is the age of the patient?
4. Any evidence of dementia?
5. Any peripheral vascular disease?

Cohen found the subjective evaluation ‘would I be surprised if my patient died in the next 6 months?’ was of strong prognostic significance in the mortality prediction. Probably it takes into accounts of other factors which were not included in 2 to 5 above. The presence of peripheral vascular diseases reflects the state of the blood vessels. Foot gangrene in a non-diabetic patient is a predictor of stroke and cardiovascular event. Infected foot gangrene in a diabetic renal patient can be rapidly fatal. (Fig. 1)



Figure 1. Gangrene of the toes

Using Cox multivariate analysis, he developed an equation which can compute the estimated risk of death on haemodialysis at 6 months based on the answers from questions 1 to 5 above. It gives 6-month mortality estimation as well as 6-month survival estimation.

The original calculation was performed using two statistical packages SAS 9.1.3 and R 2.5 on a personal computer and the tool is not easily available to the clinicians. Recently, it was made into apps called '6 month mortality on dialysis'. It can be mounted on mobile devices such as smartphone or tablet PC on both Android and iOS platforms. It is a freeware and is available for download. [3] The user enters the answers to the questions about the age, serum albumin, dementia or peripheral vascular disease of the patient and a subjective question 'would I be surprised if my patient died in the next 6 months?' and the software will return the 6-months mortality rate and survival rate.

For example, a 70 year old, fragile looking, demented male patient with a serum albumin of 25 g/L, with associated peripheral artery disease involving both lower limbs would have an estimated 6-months survival on dialysis 12.5%. Alternatively, the estimated mortality risk over the same period is 87.5%.

On the other hand, for a 20 year old, 'healthy' looking man with a serum of albumin of 35 g/L and no associated dementia or peripheral vascular disease, the predicted 6 months survival is 98.9% and the risk of death 1.1%.

Such integrated prognostic tool is handy for the renal staff to use in the ward or in the clinic. The information would help the patient and the relatives to make an educated choice of treatment and planning. (Fig. 2)



Figure 2. Using the integrated prognostic tool in the ward

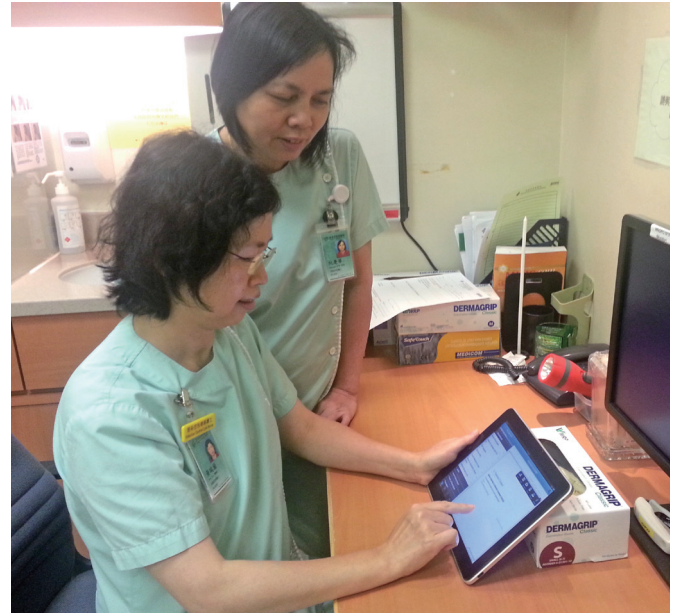


Figure 3. Using the integrated prognostic tool in the clinic

Although not yet validated in peritoneal dialysis (PD) patients, it would be useful rough guide because the above parameters affect both the PD and HD patients. If the predicted mortality rate is very high, the patient or the relatives may choose to adopt conservative (non-dialysis) treatment. Patients in Hong Kong are very open in this aspect. They are not afraid of being told of the bad prognosis, provided that it is done in a sympathetic manner.

Doctors may lament that very often, by the time the ESRD patient presents to him, the risk factors such as age, dementia or peripheral vascular disease could not be reversed. This is true and **highlights the importance of good medical control of renal patients in their early stage of disease.** Stopping cigarette smoking, good control of the diabetes, hypertension and lipids would help to protect the blood vessels and this would greatly increase the chance of survival when they reach the stage of ESRD.

Dialysis has made good improvement in the quantity (survival) and quality of life in renal patients. Good dialysis technique together with good medical treatment will make long survival with good quality of life. Gone are those days with a dismay survival estimate of 2 years on dialysis. The authors have many elderly patients on dialysis for over ten years. This integrated beside prognostic tool will empower the patients and their families to make an informed decision on the dialysis treatment.

References

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3. 6-month mortality on HD, as part of the Qx Calculate apps, from smartphone interface services.