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Singapore's first tertiary and primary diabetic kidney care collaboration – project NEMO - helps improve kidney status in 40% of treated diabetics patients

Singapore has a prevalence of diabetes of 11.3% among those 18 to 69 years of age according to the National Health Survey of 2010. According to the Survey, nearly 50% of the diabetics were not even aware that they had diabetes and of those who were aware of their illness, 32% had poor control of diabetes. Unfortunately, poor control of diabetes leads to many complications of diabetes, of which Diabetic Kidney Disease (DKD) is the leading complication.

From a study conducted among diabetic patients evaluated regularly for DKD at the National Healthcare Group Polyclinics (NHGP) between 2006 and 2009, nearly one in two had DKD. Of great concern is that of these patients, 12.3% without DKD develop new onset DKD annually. Among those with early DKD, another 7.1% develop more severe DKD each year. It is thus no surprise that DKD is the leading cause of end stage renal disease (ESRD) in Singapore. In 2009, when the Singapore Renal Registry reported that ¹61.7% of all patients starting definitive dialysis had DKD, Singapore was quoted to have the second highest incidence of ESRD due to DKD in the world. As in 2012, the ²Singapore Renal Registry reports that 65.4% of all patients starting definitive dialysis have DKD, the statistics are alarming.

Various strategies of primary, secondary and tertiary prevention have been implemented by healthcare providers in Singapore. As a result of these measures at NHGP, over 70% of diabetics have achieved acceptable control of blood glucose and ³blood pressure. Moreover, 73% of diabetics with DKD who were studied at the NHGP were already on the appropriate treatment with Angiotensin Converting Enzyme Inhibitors (ACEi) or Angiotensin II Receptor Blockers (ARB).

A kidney disease workgroup was formed in 2010 by the Division of Nephrology at the National University Hospital (NUH) and NHGP to devise additional strategies to reduce the rate of progression of DKD. A review of the treatment of DKD at NHGP revealed that although the majority was on ACEi or ARB, less than 20% of patients with early DKD were on the maximal doses of ACEi or ARB.

As studies had previously demonstrated that using ACEi or ARB at full or maximally tolerated doses reduces progression of DKD, a collaborative project was planned and Health Services Development Project funding was obtained from the Ministry of Health, Singapore. Approval allowed implementation of this strategy for Nephrology Evaluation, Management and Optimisation (NEMO) of DKD among patients on follow-up at NHGP. The specific aims of the NEMO programme are to:

- Evaluate diabetics on follow-up at NHGP for DKD
- Manage the Albuminuria (Albumin in urine) and blood pressure in DKD patients by increasing the dose of ACEi or ARB
- Optimise the management of DKD and monitor its progression

¹ 8th Singapore Renal Registry

² Renal Report 1999 to 2012, Preliminary Report

³ HbA1C between 7.1 and 8%: Blood pressure <140/90mmHg

In preparation for NEMO, doctors in NHGP were orientated to manage DKD patients so as to optimise ACEi or ARB therapy and were designated renal champions. Allied Health Personnel, known as NEMO coordinators, were employed at each of the nine polyclinics under NHGP to identify patients who had early DKD, assist doctors to optimise treatment, to educate patients, to coordinate the care of patients during and after optimisation and to help track patient outcomes. The existing Information Technology (IT) system at the NHGP was utilised to identify diabetics with early DKD for suitability to be treated under the programme and to track their progress with treatment.

Since the programme began in April 2011, until September 2013, close to 24,000 diabetic patients at NHGP have been evaluated for DKD. Of these, about 4,200 patients were considered suitable for participation in the NEMO project as they had early DKD. Of the 1,200 patients who have successfully completed the optimisation cycles, preliminary findings show that the NEMO programme has helped over 40% of those who underwent ACEi or ARB optimisation by:

- Normalisation of Albuminuria in 29% of DKD
- Improvement from Macroalbuminuria stage to Microalbuminuria stage in another 11%.

Only 3.7% of the group which has completed the optimisation cycles progressed from early DKD to more advanced DKD. This is much lower than the 7.1% of those with early DKD who developed more severe DKD in our earlier study.

“The number of patients with ESRD due to DKD has more than doubled in the decade since 1999 in Singapore. According to Singapore Renal Registry reports, there were about 250 new ESRD patients due to DKD in 1999 compared to about 600 new patients in 2012. In 2012, 69% of the new ESRD at NUH was due to DKD. Although multiple strategies are needed to tackle a chronic disease such as diabetes, the results of our NEMO programme highlight the potential to reduce progression of DKD by optimising ACEi/ARB dosage and by starting this treatment at primary care itself and by increasing patient compliance with education.” says Professor A. Vathsala, Head of the Division of Nephrology at NUH and Programme Director of NEMO.

Dr Loh Ping Tyug, Co-director of the NEMO programme, and Consultant, Division of Nephrology, NUH said, “We are very encouraged by the results of our NEMO Programme. The Programme required much collaboration between nephrologists from the NUH and doctors from NHGP to review the ACEi/ARB guidelines and doses of ACEi/ARB therapy for DKD patients. Protocols were established and NHGP doctors optimised drug dosage to achieve target blood pressure and to reduce albuminuria to the lowest achievable level while minimising side effects on blood pressure (BP), serum potassium and serum creatinine levels. 10 NEMO Coordinators were also hired and trained to educate patients with early DKD on their illness and channel them to the NEMO clinic for the doctor to assess the suitability to commence/increase ACEi/ARB therapy. The NEMO Coordinator is a very important core of the programme as she has to coordinate with doctors and patients, then follow up on the blood investigations post ACEi/ARB therapy and provide Telecare to the patients and updates the doctor. The cycle is repeated till the maximal tolerated ACEi/ARB dose is reached.”

“At NHGP, we have observed that about a third of the patients with Diabetic Nephropathy are at an early stage of Diabetic Kidney Disease. To ensure that the disease progression is slowed, addressing the condition within primary care is key to helping our patients achieve better health outcomes. Through the partnership with the NUH, we aim to address the condition in its early stages, slowing down the progression of the disease to its more advanced stages, thereby improving our patients’

quality of life. NHGP participates in the NEMO project with a focus on providing ‘whole-person’ care for our patients through a team-based approach. Our Doctors work with the NEMO coordinators to spend time with the patients to understand their lifestyle and dietary habits, advising them to modify these where necessary so as to empower them to manage their conditions better. Discussions with Nephrologists from NUH are also ongoing to optimise the care of our patients at the primary healthcare level,” shared Dr Lim Chee Kong, Co-Programme Director of NEMO, Deputy Director of Clinical Services, Family Physician-Consultant, NHGP.

“The encouraging success of the NEMO programme is a result of the commitment of every party involved, and proved that the management and optimisation of therapy for DKD patients in primary care could potentially stem the rising incidence of DKD leading to ESRD. These efforts highlight the potential for straddling the primary / tertiary care divide so as to provide optimal care to patients with chronic diseases.” says Professor A. Vathsala, Programme Director of NEMO.

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About the National University Hospital

The NUH is a tertiary hospital and major referral centre for a comprehensive range of medical, surgical and dental specialties including Cardiology, Gastroenterology and Hepatology, Obstetrics and Gynaecology, Oncology, Ophthalmology, Paediatrics, Orthopaedic Surgery and Hand and Reconstructive Microsurgery. The Hospital also provides organ transplant programmes for adults (in kidney, liver and pancreas) and is the only public hospital in Singapore to offer paediatric kidney and liver transplant programme.

Staffed by a team of healthcare professionals who rank among the best in the field, the NUH offers quality patient care by embracing innovations and advances in medical treatment.

In 2004, the NUH became the first Singapore hospital to receive the Joint Commission International (JCI) accreditation, an international stamp for excellent clinical practices in patient care and safety. Today, patient safety and good clinical outcomes remain the focus of the hospital as it continues to play a key role in the training of doctors, nurses and allied health professionals, and in translational research which paves the way for new cures and treatment, offering patients hope and a new lease of life.

A member of the National University Health System, it is the principal teaching hospital of the NUS Yong Loo Lin School of Medicine and the NUS Faculty of Dentistry.

For more information, please visit www.nuh.com.sg



About National Healthcare Group Polyclinics

National Healthcare Group Polyclinics (NHGP) forms the primary healthcare arm of the National Healthcare Group (NHG). Its nine polyclinics serve a significant proportion of the population in the central, northern and western parts of Singapore.

NHGP provides a comprehensive range of health services for the family, functioning as a one-stop health centre providing treatment for acute medical conditions, management of chronic diseases, women & child health services and dental care. The focus of NHGP's care is on health promotion and disease prevention, early and accurate diagnosis, disease management through physician led team-based care as well as enhancing the capability of Family Medicine through research and teaching.

Through the Family Medicine Academy and the NHG Family Medicine Residency Programme, NHGP plays an integral role in the delivery of primary care training at medical undergraduate and post-graduate levels.

NHGP has also been awarded the prestigious Joint Commission International (JCI) accreditation under the Primary Care Standards.

For more information, please visit www.nhgp.com.sg.