

SINGAPORE: ONE OF WORLD'S HIGHEST FOR DIABETES-RELATED LEG AMPUTATIONS

Late presentation of diabetic foot ulcers and poor public awareness of diabetes-related complications major factors

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Singapore has one of the **highest rates of lower extremity amputation (LEA) in the world**, with public hospitals here needing to conduct some **four amputation procedures a day**¹.

Researchers from the National Healthcare Group Health Services & Outcomes Research (HSOR) department conducted a 10-year retrospective study of **2,170 diabetes patients with LEA** from Tan Tock Seng Hospital. Their **average age was about 64** and some **22% died within one year**. Mortality was due to multiple complications.

DIABETES AND LOWER EXTREMITY AMPUTATIONS IN SINGAPORE – A SUMMARY

- **Definition:** Lower extremity amputation (LEA) is defined as the surgical removal of the toe, foot or leg. Major LEA refers to amputation of the leg, below or above the knee
- **Early signs:** A major complication of poorly controlled diabetes is arterial disease which affects blood vessels supplying multiple organs. High blood sugar causes a shutdown of the process which maintains and protects healthy blood vessels from damage, resulting in vessels hardening and narrowing. Depending on which blood vessels are affected, this can lead to heart disease, stroke, or peripheral arterial disease. In addition, diabetes can affect the peripheral nervous system, leading to neuropathy or loss of sensation. Long standing diabetes may also be associated with kidney disease, retinopathy and impaired vision.
- **Diabetes is a multi-organ disease:** The combination of these factors can lead to blindness, loss of feeling, foot ulcers, infection and gangrene. Without early and adequate treatment, this can progress to lower extremity amputation. About **20% of all diabetes patients will develop foot ulcers** in their lifetime. In half of these cases, patients will also suffer from peripheral arterial disease. The importance of foot ulcers in the evolution to limb loss is underscored by the fact that some **85% of major amputations are preceded by foot ulcers**.

¹ Committee of Supply Debate 2016, Minister of Health Gan Kim Yong, 13 April 2016.

https://www.moh.gov.sg/content/moh_web/home/pressRoom/speeches_d/2016/speech-by-minister-fo-health-mr-gan-kim-yong-at-the-moh-commit.html

- **Major contributing factors to LEA:**

- **Late presentation:** Ideally, patients with a foot lesion should visit the doctor as soon as possible. Delays of a few days or weeks drastically reduce chances of successful intervention to save limbs.
- **Co-morbidities:** About 80% of LEA patients have significant co-morbidities which include high blood pressure, and ischaemic heart disease.
- **Lack of awareness/ poor control of diabetes:** Patients are often unaware of the risks posed by untreated foot ulcers. Some have poorly controlled diabetes which can accelerate the spread of infection and result in an unsalvageable situation.

TIMELY INTERVENTIONS NEEDED

Patients who seek treatment early enough have the option of various intervention treatments to salvage limbs. These include treatment of infection (**drainage of abscesses or debridement**) and re-vascularisation (**angioplasty or bypass**). At TTSH, limb salvage therapies have led to a **20% reduction in LEA operations in 2015** compared to the year before (Annex).

MOVING FORWARD – INTEGRATED CARE

Patient education and screening in the community can lead to early interventions and potentially reduce the need for LEA. NHG is working towards more seamless integration between the acute hospital, primary care and community sectors to provide patients with a robust support network and promote wellness. “This is in line with the healthcare sector’s shift from episodic to sustainable integrated care, developing a model that emphasises closer relationships between the patients and the healthcare system,” said Professor Philip Choo, Group CEO of NHG.

“This is a major paradigm shift from illness care to wellness care. We need to move away from transactional medicine, where patients are told what to do. The new model of care aims to encourage patients to take greater ownership of their health, promote behavioural changes and better lifestyle habits, as well as early detection of diseases through appropriate health screening and case finding. It also integrates the healthcare system with social service providers in the community, enabling those with stable chronic conditions to be better managed at home.”

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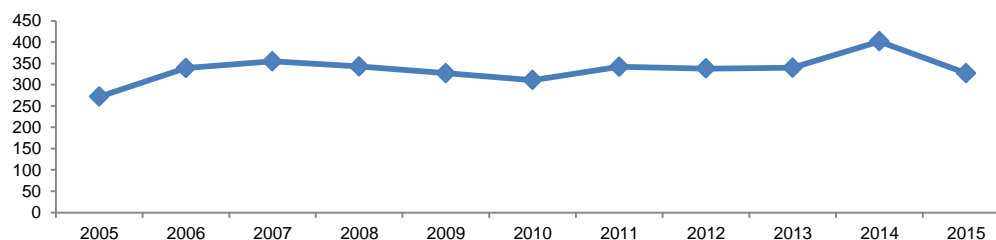
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ANNEX: LEA Operations at Tan Tock Seng Hospital (2005 – 2015)

Year	LEA
2005	272
2006	339
2007	355
2008	343
2009	327
2010	311
2011	342
2012	338
2013	340
2014	402
2015	327



GLOSSARY OF TERMS

ENGLISH	MANDARIN	DEFINITION
Metabolic syndrome	糖症候群	A combination of ≥ 3 metabolic conditions including hypertension, high cholesterol, obesity.
Microvascular	微血管	The fine blood vessels in the eyes, kidneys, etc.
Macrovascular	大血管	The larger vessels in limbs, heart, etc.
Lower Extremity Amputations (LEA)	下肢截肢	Amputations of the lower limbs including toe, foot and ankle.
Disability Adjusted Life Year (DALY)	残疾调整寿命年	A measure of disability burden based on number of years lost due to poor health, disability or premature death. 1 DALY = one lost year of healthy life
Quality Adjusted Life Year (QALY)	素质调整寿命年	A measure of disease burden including both the quality and quantity of life lived. 1 QALY = one year of life lived in good health
Burden of Disease (BOD)	疾病负担	The impact of a health problem as measured by financial cost, mortality, morbidity, or other indicators. It is often quantified in terms of quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs).