Case study: The role of the geko™ device to prevent Deep Vein Thrombosis (DVT) on a patient undergoing rehabilitation on the intestinal rehabilitation ward.

Authors: Dr Charlotte Wong

London North West University Healthcare, Northwick Park Hospital.

Subject

21-year-old female.

Relevant Clinical History

A 15-year-old female presented to A&E with abdominal pain, recurrent nausea and vomiting following a short vacation. She underwent several investigations for her symptoms but developed significant weakness in her legs and immobility following a colonoscopy. She lost weight and her symptoms progressed, resulting in a prolonged admission at hospital requiring nasogastric (NG) feeding. There were several possible factors associated with her illness. Over the following months, with extensive input from the Gastroenterology and Neurology teams, she acquired a clinical diagnosis of Ehler's - Danlos Syndrome.

Clinical Presentation

Unfortunately, she developed worsening enteral tolerance associated with weight loss and required PEG-J tube insertion that was complicated by tube refluxing back into her stomach. As such, she was started on parenteral nutrition and transferred from her local hospital to Northwick Park Hospital at the end of last year for nutritional assessment.

Her inpatient medications included the following: ondansetron IV and PO, mirtazapine, oxybutynin patch, liquid paraffin, cetirizine, lansoprazole, hyoscine, paracetamol, butrans patch 20mcg/hour, and buprenorphine buccal PRN.

In line with good medical practice, hospital policy and NICE guidelines, she was started on VTE prophylaxis due to significantly reduced mobility and other risk factors. Low molecular weight heparin was deemed ineffective as it could not be absorbed through the skin. In addition, the standard adult TED stockings did not fit and there were no paediatric options available.

Discussion:

Venous thromboembolism (VTE) occurs due to a blood clot (thrombus) in the veins. It most commonly forms in the deep veins of the leg or pelvis, known as deep vein thrombosis (DVT). The thrombus can

dislodge from its original site in the vein and travel into the bloodstream blocking blood flow in the pulmonary artery[1]. This is known as pulmonary embolism (PE). The collective word for DVT and PE is VTE[2].

NICE guidance NG89 provides prophylactic recommendations for VTE. It recommends mechanical and pharmacological interventions. Anti-embolism stockings could not be recommended for the patient as the smallest sized anti-embolism stockings (AES) did not fit. Although her ankle circumference was in range for the smallest size, her calf measured 23cm and extra small stockings were not recommended for a calf circumference of less than 26cm. Intermittent Pneumatic Compression (IPC) could not be administered due to access issues.

As mentioned before, this patient was offered pharmacological intervention but due to fluid leakage at the injection site it was deemed ineffective. Over the period of no VTE prophylaxis, the patient developed localised swelling and symptoms of a blood clot. Doppler ultrasound confirmed that a clot was not present, however, the lack of preventative measures concerned the patient and this was escalated to the Matron who recommended the geko™ device.

The geko™ device

NICE guidance (MTG19) supports the geko™ device to reduce thromboembolism risk for patients when other mechanical and pharmacological methods of prophylaxis are impractical or contraindicated[3]. The geko™ is a battery powered, disposable, neuromuscular electrostimulation device designed to increase blood flow in the deep veins of the leg[4], reducing the risk of VTE. The geko™ device stimulates the common peroneal nerve activating the calf and foot muscle pumps, increasing venous, arterial and microcirculatory blood flow[5,6].

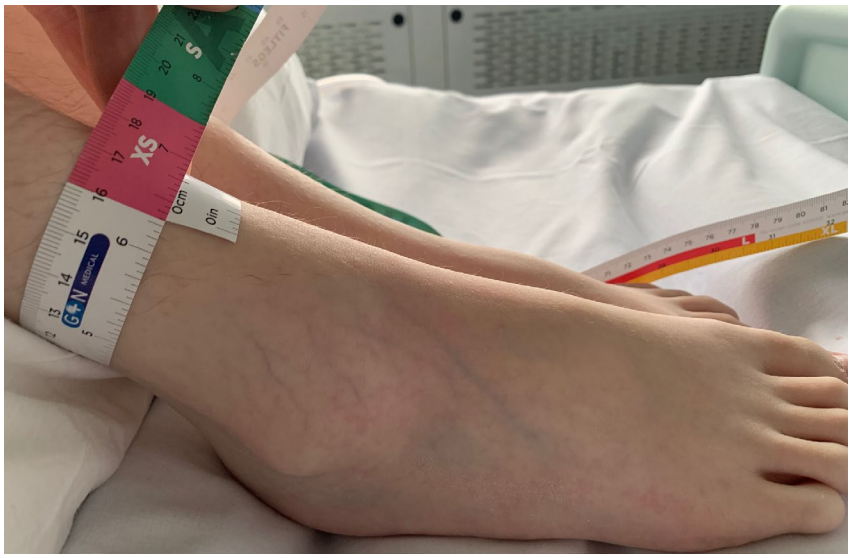
The patient has been using the geko™ device for 3 weeks and length of treatment was continued at home for a few days based on the continued clinical need to reduce VTE risk.

Results

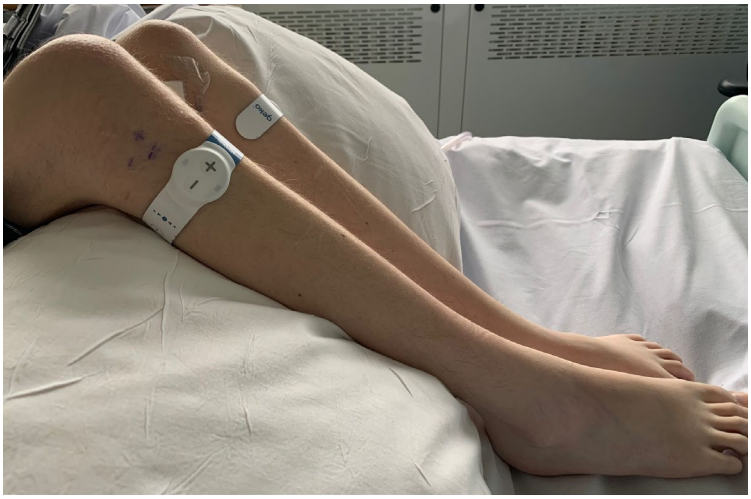
There was positive feedback from the patient and staff who found them easy to use. There was no reported reaction to the adhesive.

The patient commented that the geko™ device felt a little strange when first applied but she soon became used to them after a few hours and was eventually less aware of them being in place. Overall it was well tolerated, comfortable and did not interfere with her sleep. She also felt relieved that there was an intervention to reduce the risk of DVT while she was in hospital. There was no clinical evidence or concern of DVT thereafter.

Picture 1 *- Ankle circumference*



Picture 2 - *Patient wearing the geko™ device*



Picture 3 - *Patient demonstrating the smallest size anti-embolism stocking AES which is too loose for her leg.*

Conclusions

The geko™ device provided an alternative form of prophylaxis when other measures were not suitable. It was tolerated well by patient and helped to prevent DVT in patient. Clinician feedback was positive where clinician commented they would be likely to consider the geko™ for future patients who may be unsuitable for AES or IPC to help prevent VTE.

References

1. https://www.nice.org.uk/guidance/qs29/chapter/Introduction-and-overview
2. https://link.springer.com/article/10.1007/s40258-014-0139-0
3. NICE Guidance (MTG19). The geko™ device for reducing the risk of venous thromboembolism. Issued: June 2014
4. A.Nicolaides, M Griffin, Measurement of blood flow in the deep veins of the lower limb using the geko™ neuromuscular electro-stimulation device. Journal of International Angiology August 2016-04 3.
5. Tucker A, Maass A, Bain D, Chen LH, Azzam M, Dawson H, et al. Augmentation of venous, arterial and microvascular blood supply in the leg by isometric neuromuscular stimulation via the peroneal nerve. The International journal of angiology: official publication of the International College of Angiology, Inc. 2010 Spring;19(1): e31-7 4.
6. Jawad, H., Bain, D., Dawson, H., Crawford, K., Johnston, A., Tucker, A.T. The effectiveness of a novel neuromuscular electrostimulation method versus intermittent pneumatic compression in enhancing lower limb blood flow. 2014

firstkind
living science