

The rise of the robots and AI — their impact on lymphoedema diagnosis and treatment

Neil Piller

We see automation and robots wherever we look and go — at the airport, in our cars and in our homes. Automation and robots are already in medicine being most prominent in the surgery area, but will they spread into the diagnosis and treatment arenas for lymphoedemas?

In the August 2016 edition of *New Philosopher*, in an article entitled “Doctor or Data”, Marc Gutenstein hit home a reality that may not be far away. But there are pros and cons! The physician writing the article indicated that he’s not sure where he will be in a decade or two — will he be needed? He mentions that big data and machine learning will reduce his practice to a series of “well-defined technical decisions”. Data (physical, mental, demographics, genomics etc) will be gathered and synthesised, and followed by a “battery of tests”, which will provide a diagnosis and lead to “perfect health”. He adds “work feels too hard to consider a machine doing this job”. However, our communications are often far from clear and often fail miserably when, in fact, we need robust and precise delivery.

So we are currently often faced with errors which, by the way, are sort of accepted as an expectation — none of us are perfect in our communication skills. Gutenstein states: “When I stand at my patients bedside, I’m not just a biological automation, some wet reservoir for an imperfectly accrued knowledge. I’m an interpreter meeting with my patients as one human to another, and interacting with my patients within a communication

space where the ambiguities of language, understanding and culture meet.” He then asserts “the shared decision making that follows is a negotiation where knowledge, expertise, experience and science is brought by the professional and the patient brings their personality and associated preferences, fears and strengths”.

Health, its recognition and maintenance is never cut and dry; it’s imprecise, the measures fraught with uncertainty. We can’t say that a person is healthy or not — health is not just an on/off switch, it’s a spectrum, and its maintenance is really an art. In a way, medicine is an art (although good science is critical), and it’s about the idiosyncracies of the individual in front of you, or being treated by your hands based, on what you have measured, but also on what you know from expertise gained through courses, programmes and years of experience.

Can machines feel, detect you are tense or uncomfortable, give you a gentle hold of the hand or a listening ear? Can a machine offer a patient a feeling of being cared for and allow for a much-needed sense of control and self determination, and can they acknowledge you as an individual, rather than just a series of switches that need to be turned on or off?

I don’t think anyone would say that automated diagnostics are bad; they are currently used in every area of medicine. But it’s in the treatment/management side that it would seem that robots are generally a fair way off, but their involvement may be much closer for some of the things we do (e.g. garment selection and bandaging/wrapping).

I read a recent email from Prof Byung Boong (BB) Lee (2017) on the Vasculab website and he summarises what many feel. His lament is worth repeating here. Last year, Professor Lee attended a conference

that “gave much fascinating information to fill the brain — more than we could handle. But sadly, not a single soul gave any advice about how to fill up the heart — especially to the new generation (of vascular surgeons in this case). Old man’s lament? Sure, I am old enough to remember what we were taught to become a good surgeon. In addition to good brain/knowledge, we were also raised to have a warm heart [and] with compassion to deal [with] the patients as a human being like us.”

“Instead of sparing the time to feel, touch, talk, listen, and encounter with the patient as a human being with emotion, we now became a robot facing only to the computer to interpret what it orders, no more no less! Naturally, we lost the ability to look at the patient as a whole with no more bird’s eye view, but obsessed only to what we could do instead of why we should do! We now forget we were taught to put ourselves in the patient’s shoes so that we would know what they really need. I learned that what they (the patients) seek most is my shoulder to let them cry on as a human being and listen from their side.” Professor Lee added: “Talent makes you good. Passion makes it great, and Touching lives makes it Divine.”

Dennett (2017) uses the term “competence without compassion” for artificial intelligence (AI), but says there is a new wave of projects that aim to add comprehension to machine learning systems, but his thoughts are that AI is best used as a tool rather than a colleague, as then “we will have the same problem we have with colleagues; we won’t know for sure what they know, and they may not want to tell us!”

But he is clear that even now, there are some areas of medical diagnosis and disease/disorder treatment where a

Neil Piller is Director Lymphoedema Research Unit, Department of Surgery, School of Medicine, Flinders University, Adelaide, South Australia, Australia.

computer system can do better. He warns: “Doctors who overrule the software could later be deemed irresponsible or liable for malpractice.” Wow! So doctors (and many other healthcare professionals) might just end up as “glorified gatekeepers with good bedside manners and an ability to push buttons”.

We see this already. Garments are made to order (perfectly knitted by machines), but its in the orders for a garment that errors can lie in our measurement, and perhaps in this latter area a machine can do better — perhaps we already have robots and AI associated with equipment like the Perometer (Perometer Messgeräte) which can indicate circumferences at 4 mm intervals; the MoistureMeterD (Delfin Technologies), which tell us the fluids at various depths, and the Flinders indurometry units, which can tell us about fibre.

So we already know (almost) everything we need to know about an affected area or limb and it's often on this basis that we apply a bandage to facilitate needed compression. But we don't always get the

pressure or the pressure gradient right and so don't achieve the best outcome for the patient (Parkinson et al, 2017).

This means that right now there is room for AI once we (or the computer) feeds in the data that other machines/computers have recorded to a bandaging machine, which will then get everything right or at least optimal, according to our best science.

Getting bandaged by a machine? There's no touch, no compassion, no listening, no caring — is it this that makes a difference? Are we as healthcare professionals about to become nothing more than gatekeeper and button pusher or will we maintain a role similar to the one we have today in the future?

Most articles I've read think healthcare professionals and allied health workers will be around in the future doing a lot of what they are doing now. Why is this? Dennett (2017) asks “what if the internet goes down or we lose power (as we did recently in Adelaide for 3 days) or the machine fails — will we still have the skills to cope?”

Gutenstein (2016) indicates he “would wish for a machine that feels a little something of what you might feel, and so senses that pregnant pause in conversation”, and he wants to see a “medical helper with the ability to sense the subtleties of language and emotion”. In essence, he would like to see “simply a person” by his side and that “the key to ‘health care’ lies in the word — it is the art of providing not just technical outcomes ... but a feeling of being cared for and a sense of control, a personal journey and an individual narrative”.

Quod Bonum Tenete? What do you think is our future? Let us know!

References

- Dennett D (2017) That's a termite colony between your ears. *New Scientist* 3112: 42–3
- Gutenstein M (2016) Doctor or Data? *New Philosopher* 13: 113–6
- Lee BB (2017) *Peripheral Vascular Disease*. Vasculab (invite-only site). (accessed 28.02.17) and personal communication
- Parkinson LA, van Zanten M, Piller N, Arkwright JW (2017) A high resolution tape sensor improves the accuracy of applied pressure profiles during lower leg bandaging – results from a study using a fibre optic sensing tape. *International Wound Journal* doi 10.1111/iwj.12741

Writing for *Journal of Lymphoedema*

Journal of Lymphoedema welcomes a range of articles relating to the clinical, professional, and educational aspects of lymphoedema. If you have written an article for publication or if you are interested in writing for us and would like to discuss an idea for an article, please contact the editor, Adam Bushby, on 0207 960 9673 or email abushby@omniamed.com

