Special Report **Future of Healthcare**

Healthcare

AI generated advice eases long waits for surgery

The technology is being used to help patients prepare better for treatment

Tim Ashcroft was helped by the Surgery Hero app while he waited for treatment © Rachel Adams/The Sunday Times/News Licensing

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Published 6 HOURS AGO

When Tim Ashcroft was told he needed surgery to reverse a stoma operation, he might have been fated to languish in a queue for treatment from England's NHS without further attention until his turn came round.

Instead, thanks to innovative technology, the businessman from Cheshire in the north of England was flagged as in need of additional support while he waited, having lost five stone since an earlier operation to remove his oesophagus following a cancer diagnosis.

He was linked up with an app, Surgery Hero, which offered guidance on exercise, food intake and his mental health. A "coach" was on the other end of a video call when he preferred a human touch.

The 74-year-old ultimately stabilised his weight, making him a stronger and safer candidate for surgery — and a convert to the proactive approach. "When resources are stretched — and they're certainly more than stretched in the NHS these days — if this is a way where people can get some support on a semi-virtual basis, I think it's tremendous," he says. "It's a relatively low cost way of doing it as well."

Behind Ashcroft's improved outlook is a company called C2-Ai which was spun out about 15 years ago from the UK's Department of Health. It was inspired by the belief that a vast global trove of patient records contained insights which could help determine which were the most urgent candidates for surgery, and which should be given extra support to ensure they were in the best condition to undergo its rigours.

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Its first iteration, devised by Graham Copeland, a mathematician-turned-surgeon, was called POSSUM — "the physiological and operative severity score for the enumeration of morbidity and mortality". The current AI-powered model, trained using a diverse dataset of approximately 500mn "patient episodes" — a defined period of care for a specific condition — from across the world, was introduced about four years ago.

Mark Ratnarajah, a paediatrician who is the company's UK managing director, adds: "In shorthand, it basically allows you to look at people and say, 'how would they respond to . . . surgery . . . as an individual', rather than treating everyone the same."

The data could then be aggregated “to look at cohorts of patients under a particular clinician or department or a hospital” and in turn to benchmark their performance against others to drive quality improvement. But when the Covid pandemic began “all of that went out the window, because everyone was fighting fires, dealing with emergencies”, he recalls.

However, Rowan Pritchard Jones, a plastic reconstructive surgeon who was then medical director of the former St Helens and Knowsley Teaching Hospitals NHS Trust in England’s north-west, was among a group of medics who saw a chance to “pivot” the focus of the technology to help manage swelling waiting lists for routine care.

Whereas the previous emphasis had been on looking backwards and trying to work out why someone’s outcome may have been worse than expected, the goal was now to deal with a weaker prognosis before surgery even took place.

Pritchard Jones, who is now medical director of the Cheshire and Merseyside Health and Care Partnership, sums up the approach: “Don’t tell me what *has* happened, but tell me what risk we’re holding and what *might* happen.”

Pritchard Jones says, with the insights gained from C2-Ai, they called in their highest-risk patients in order to determine whether surgery or anaesthesia needed to be carried out differently. They also began “prehabilitation” with selected patients — including Tim Ashcroft — to reduce the number brought in as emergencies.

Ratnarajah says around 2,000 patients in Cheshire and Merseyside received this tailored “waiting well” support, with results including “a six-fold decrease in complications”.

There were demonstrable savings for the NHS, he added. “These patients are spending less time in hospital. They’re not having unplanned admissions to intensive care . . . and there [was] a halving of readmission rates. In terms of best bang for the NHS pound, you’re getting a better outcome with less cost,” he adds.

The C2-Ai technology is now being deployed in other countries, including Canada, Italy — and Sweden, where Stockholm's Karolinska University Hospital uses it primarily as a tool to drive continuous improvement in the quality of care and ensure any systemic failures are quickly identified.

Gunnar Sandersjöö, head of the department of trauma acute surgery orthopaedics, says the hospital long ago ceased to blame individual staff members when something went wrong, instead looking to discern the wider issues that may have lain behind mistakes.

He gives the example of a ward whose patients may have more pressure ulcers than would be expected "and then we have to see [if there is] anything we can do to teach [staff] better. It could be because they were inexperienced personnel working there."

He adds: "We try to find ways to make healthcare better, basically . . . by being totally transparent in the problems that we're having."

This ensured a constructive, rather than a critical, approach to putting things right. "There is a risk in a healthcare system which is punishing a hospital with a bad record . . . and rather it's a sign that they need help", he says.

It was hard to say whether they could have delivered the same kind of improvements without the data insights supplied by C2-Ai "but it's certainly helpful for us to find problems, and by doing that it obviously saves money and complications in the patients' lives which is the most important thing," he adds.

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