

# Virtual postoperative clinic: can we push virtual postoperative care further upstream?

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Virtual care refers to remote healthcare interactions between patients and health professionals, predominantly using telecommunications networks. Virtual care interactions are a form of information exchange that guides care decisions. These interactions aim to enhance the patient experience and outcomes of care. Healthcare-related virtual care interactions can range from video clinic appointments to remote monitoring.<sup>1</sup>

The role of virtual care in surgery is rapidly evolving, and the nature of virtual interactions varies according to the phase of the surgical journey—spanning preoperative evaluation and assessment, preparation for surgery, intraoperative care and postoperative care.

The history of virtual surgical postoperative care actually goes back several decades. In a cohort of 536 patients with hip fracture published in 1990, telephone contact predicted return of function a year following surgery, likely due to improving patients' psychological function, reinforcing postoperative medication regimens and encouraging consistent participation in rehabilitation.<sup>2</sup>

Despite a rapidly evolving technological landscape, telephone contact with patients remains a cornerstone of remote interactions with patients after surgery. In this issue of *BMJ Quality & Safety*, Healy *et al*<sup>3</sup> report the results of a randomised controlled trial comparing a telephone-based virtual outpatient clinic with an actual outpatient clinic for the follow-up of general surgery patients 6–8 weeks after discharge from hospital. Of 107 subjects randomised to virtual follow-up, 98 (92%) were successfully contacted by telephone, of which 10 (10%) had postoperative issues and 3 of whom ultimately attended a conventional clinic for follow-up. Of 102 subjects

randomised to the conventional outpatient clinic follow-up, 83 (81%) attended the appointment, of which 16 (19%) had postoperative concerns. Patients followed up by virtual care were more likely to be 'very satisfied' than conventional clinic follow-up (95% vs 56%); most patients in both groups expressed a preference for virtual follow-up in the future.

Virtual postoperative follow-up offers not just convenience—it may also improve care. The results reported by Healy and colleagues suggest that in-person follow-up in the clinic may result in inappropriate overuse of investigations. For example, 4 of 12 patients booked for follow-up endoscopy in the conventional care arm had no clear indication for a repeat procedure. Physicians might perceive greater pressure to recommend tests instead of offering reassurance for patients with mild postoperative symptoms, when facing an actual patient in clinic, already inconvenienced by a trip to the hospital outpatient clinic.

While patients clearly prefer virtual follow-up and there may also exist a salutary collateral reduction in inappropriate follow-up tests and procedures, we need to resist the temptation to overstate the potential benefits to the health system resulting from this model of care. Unless the virtual follow-up visits are largely automated—perhaps through automated telephone communications systems<sup>4 5</sup>—virtual follow-up visits will still require involvement of clinical care providers and their time will need to come from somewhere.

Whereas Healy *et al* emphasise the value of virtual follow-up after the completion of six to 8 weeks of surgical recovery, the greatest potential of postoperative virtual care likely lies upstream in the early postoperative phase,<sup>2</sup> traditionally

defined as the first 2 weeks after surgery.<sup>6,7</sup> The term 'quality of recovery' has recently been used to describe the trajectory of a person's return to baseline function and quality of life following surgery, particularly with respect to limitations in self-care, pain, mood and mobility.<sup>6</sup> A practical definition of good quality of recovery is function at 80% or more of baseline, without a drop in quality of life scores at postoperative day four.<sup>6</sup> Poor quality of recovery impacts the short-term experience of care and also has long-term implications.<sup>8</sup> The ability to capture patient data remotely makes quality of recovery an appealing focus of postoperative virtual care.<sup>7</sup>

The focus on a quality of recovery measure of postoperative health is new. Historically, the quality of postoperative care was defined largely by the absence of major complications.<sup>6</sup> Modern surgical and anaesthetic techniques have made major complications following surgery rare. Low major complications rates have made early discharge and day surgery popular with surgeons and patients. Early discharge has important potential benefits for health systems, saving up to 30% of the cost of hospitalisation for common surgical procedures.<sup>9</sup> However, early discharge has potential risks. Leaving patients unsupervised in the early postoperative period exposes patients to preventable suffering. A 2-year cohort of 1118 day surgeries found nearly half of patients experienced poor quality recovery.<sup>6</sup>

Poor quality of recovery in the immediate postoperative period can cause long-term adverse outcomes. The risk of pain syndromes increases with increasing levels of uncontrolled acute postoperative pain<sup>8</sup> following common procedures such as breast reconstruction, groin hernia repair and thoracotomy.<sup>8,10-12</sup> Prolonged in-patient stays and early readmission after discharge are often a consequence of complicated early recovery phases and are associated with reduced long-term functional recovery,<sup>2</sup> and a twofold increase in mean hospital costs.<sup>13</sup> As early discharge becomes more common, increasing attention to early phase quality of recovery will become necessary to prevent adverse clinical and economic outcomes of poor quality of recovery.

The playing field of virtual surgical care is increasingly moving upstream into the early postoperative phase, with innovative smartphone apps focused on the measurement of quality of recovery,<sup>14-17</sup> some of which have been evaluated in randomised controlled trials.<sup>18,19</sup> Smartphone apps collect daily quality of recovery data to identify poor recovery for early intervention for procedures such as same day breast reconstruction<sup>14</sup> as well as a broad range of day surgery procedures.<sup>19</sup> Telephone-based virtual clinics such as the one described by Healy *et al* offer convenience and enhanced experience of care, but miss the opportunity to improve quality of recovery earlier in the postoperative course.

What will the future of postoperative care mobile apps look like? Increasingly, virtual care will evolve from passive quality of recovery measurement to active real-time recovery.<sup>20</sup> Real-time recovery uses quality of recovery assessments to implement early, aggressive course correction.<sup>7</sup> For example, an ambulatory total knee replacement programme discharges patients home within 6 hours of surgery using a mobile app to track symptoms and biometric sensors to measure mobility, linking patients in real-time to the surgical team using 2-way video communication.<sup>21</sup> Course correction of adverse symptoms can occur in real-time, in patients' homes.<sup>21</sup>

The real promise of virtual postoperative care is to move beyond remote identification of early complications and support real-time recovery that aims to identify and treat early phase complications aggressively. Enhancing the quality of recovery in the early postoperative period, particularly in the out-of-hospital settings which are increasingly common following ambulatory surgery, can improve long-term postoperative outcomes as well as enhance the acute postoperative patient experience. Virtual clinics will play an important role. But the biggest opportunities lie upstream, enhancing patients' quality of recovery in real time.

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