Can behavioural change interventions be used to tackle the misdiagnosis of appendicitis and improve patient outcomes?

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Right iliac fossa (RIF) pain represents the most prevalent emergency surgery presentation, often stemming from appendicitis. Appendicitis commonly manifests with nonspecific symptoms, posing challenges in diagnosis. Appendicectomy, the surgical removal of the appendix, is widely regarded as the gold standard treatment for appendicitis, with approximately 50,000 procedures conducted annually in the UK (1). However, there is a mounting concern that a considerable proportion (20-30%) undergo surgery despite having a normal appendix (2-6). This translates to as many as 15,000 unnecessary appendicectomy operations each year, exposing numerous patients to the risks associated with surgery without therapeutic justification. Postoperative complications afflict around 1 in 7 patients and encompass various issues such as wound infections, pain, abscess formation in the skin and abdomen, pneumonia, reoperation, and even the necessity for intensive care (7-8). Notably, there appears to be a comparable complication rate between patients with a negative appendicectomy and those with confirmed non-perforated appendicitis (9). Moreover, undergoing an unnecessary operation leaves the underlying condition untreated, potentially perpetuating symptoms. Given these risks, achieving an accurate diagnosis is paramount to circumvent unnecessary surgery. A report commissioned by a UK regulator identified diagnostic errors as the third leading cause of preventable harm (10). Thus, ensuring a positive diagnosis is crucial to prevent patients from undergoing unwarranted surgical interventions.

In comparison to other similarly developed countries, the UK’s unnecessary operation rate for appendicitis is remarkably high (6). The use of different diagnostic practices in the UK may help to explain this discrepancy. In the United States, the percentage of appendicectomy patients receiving a diagnostic CT scan increased from 1% to 97.5% and in the exact 18-year time period the negative appendicectomy rate dropped from 23% to 1.7%(11). In the Netherlands 99.5% of patients have preoperative imaging and the negative appendicectomy rate is approximately 3% (2). In the UK, there is almost no preoperative risk scoring and only 32.5% of patients receive preoperative diagnostic imaging (2).

A change in the behaviour of surgeons is hard and takes time. The translation of high-quality evidence into clinical practice has traditionally taken time and can encounter resistance. NICE guidelines have a transition phase before widespread use, laparoscopic surgery took decades to be widely adopted in surgery, enhanced recovery after surgery and the World Health Organization trauma checklist have both been revolutionary improvements in surgical care but have taken decades to achieve universal adoption (12,13). Clinical risk scoring and CT scans with high levels of diagnostic accuracy have been available for years, however the overtreatment of these patients remains commonplace.

Behavioural change science is fast being recognised to have a pivotal role in the understanding of decision making and team dynamics. It has been successfully applied to public health promotion, economics, and policy implementation. In order to improve the translation and implementation of evidence-based medicine rapidly, a collaborative multidisciplinary approach should be adopted. This should start with examining the wider barriers and solutions to behavioural change, and how
this applies to contemporaneous surgical practice, Figure 1. The harmonisation of clinical practice, alignment of decision making and reinforcement of surgical teams would bring negative appendicectomy rates in the UK in line with global standards.

The EAGLE study was a cluster-randomised trial that implemented a complex behavioural change intervention aimed at reducing anastomotic leaks after right colectomy surgery (14). Across 2700 surgeons, 3200 patients from 64 countries (14), the findings showed that high team-engagement directly translated into higher implementation of clinical interventions (risk scoring, intraoperative checklist), and a significant reduction in anastomotic leak in adjusted analysis. EAGLE underlined the importance of imbuing good team practice by providing cohesion to teamwork and that multimodal approaches are needed for sustainable behavioural change.

High-quality educational modules, real-world tested, with process data to facilitate improvements in content, is needed to move implementation science in surgery forward. Modules can be easily scaled up and rolled out nationally and internationally, to be immediately effective in bringing benefit to patients. Ultimately, bring the UK in line with global standards for minimising unnecessary surgery in patients with right iliac fossa pain.

References

Figure 1: Conceptual framework derived from the social ecological model for behavioural change in multidisciplinary surgical teams


