Elective Ambulatory Unit: Experience of Local Anesthetic Only Surgery During the Pandemic.

Jeans E, Talwalkar S, Gebrye T, Yeowell G, Fatoye F, Hayton M

Abstract

Background

The second COVID-19 wave severely limited access to elective surgery.

Methods

Between December 2020 and May 2021, 530 patients underwent a procedure in the elective ambulatory unit (EAU), a walk-in and walk-out model of surgery, and we used a prepandemic cohort of day-case patients for comparison.

Results

We have had no confirmed cases of COVID-19 transmission on-site. The infection rate for EAU and day-case units for carpal tunnel decompression was 1.36% and 2%, respectively, and this difference was not significant, *P* = .696. Patient satisfaction was excellent at 9.8 of 10. The waiting time from primary care referral to carpal tunnel decompression was cut from 36 weeks to 12 weeks during the study period. Significant benefit in efficiency and cost saving was also found.

Conclusion

Elective ambulatory unit provides a template to perform high-volume low-complexity hand and wrist surgery in a safe, efficient, and cost-effective manner.

Keywords: WALANT, ambulatory surgery, local anesthetic, COVID-19, efficiency

Introduction

The COVID-19 pandemic severely limited the access to elective surgery with anesthetic and nursing staff being redeployed to intensive care units thereby reducing elective bed capacity. This resulted in significantly increased waiting times for elective surgical treatment on the National Health Service (NHS). A review of hand and wrist surgery performed as either a day case or overnight stay during the first wave demonstrated that the risk of contracting COVID-19 was minimal. [1] Local anesthetic only surgery has been long established in hand surgery and has a proven safety record. More recently, this has been known as wide-awake local anesthesia no tourniquet (WALANT) surgery and is routinely performed away from the main theater environment including community settings around the world.[2-7]

Before COVID-19, we practiced a day-case model where all patients (local and general anesthetic cases) were brought in first thing in the morning on the day of surgery and then asked to wait on a ward for their slot in the theater. The local anesthetic cases were mixed in between the general anesthetic cases. With a desire to minimize the time patients were in the hospital, we changed our admission pathway by opening an elective ambulatory unit (EAU). Patients were given staggered admission times close to their expected operation time. All cases were performed under local anesthetic only as walk in and walk out of theater.

Elective ambulatory unit was established to deliver safe and timely surgery for patients with hand and wrist conditions under local anesthetic infiltration. There was no need of an anesthetist and skeleton nursing staff during the second COVID-19 wave in December 2021. Initial focus was on cases where a delay in timely surgery would worsen the outcome of surgery, including nerve decompression at the wrist and Dupuytren surgery. [8] Such was the success of EAU, we quickly expanded the procedures performed. The focus of this article was on our experience with carpal tunnel decompression (CTD). Carpal tunnel syndrome is the most common compressive peripheral neuropathy in the United Kingdom. [9] As it is a high-volume surgery that is performed in a relatively uniform fashion by most surgeons, the results can be compared across other health care providers. Carpal tunnel decompression has been identified by NHS England Improvement as an intervention that should be standardized throughout the NHS. [10] The efficiency savings between performing CTD under general anesthetic/regional block and local anesthetic only are well reported. [11] The article discusses the impact of walk-in and walk-out hand surgery on efficiency and cost savings compared with a day-case model.

Methods

Our institute was ideally suited for providing surgical treatment during the pandemic as a designated green site, whereby all those attending for treatment required a negative polymerase chain reaction (PCR) test within 72 hours of admission and self-isolation before attending. Since December 2020, all staff members have been using twice weekly lateral flow tests.

In December 2020, the EAU was opened. This was a stand-alone theater away from the main theater environment. The EAU was arranged to facilitate a circular patient flow, from admission, surgery, and to discharge areas, with only 1 patient allowed in each area at a time. This maintained social distancing and a clean area between patients. Admission times were staggered, rather than all patients arriving early for either a morning or an afternoon session which had been our prepandemic model. Each theater session was 4 hours long and divided into 15-minute blocks of 1 unit of surgical time. Image-guided steroid injections were scheduled as 1 unit, 2 units for CTDs, and 3 to 4 units for Dupuytren fasciectomy depending on complexity.

There were no set criteria for listing a patient for CTD in our hospital. It was at the discretion of the treating clinician to assess clinically the presence of carpal tunnel syndrome with or without neurophysiology. Patients from EAU were not excluded based on the American Society of Anesthesiologists (ASA) grade or prescribed medications including warfarin or direct thrombin inhibitors, as the full resuscitation team was available on-site. Patients were added to a pooled waiting list. All CTDs were performed via an open technique, and the use of torniquet was at surgeons' discretion. Full prep and drape was used rather than field sterility. No routine antibiotics were given, and usually 1% Xylocaine with 1: 200 000 adrenaline was used for local infiltration to provide anesthesia. Patients were given specific postoperative advice sheets regarding their surgery, on wound care, and rehabilitation before discharge. Each patient was provided with a pain pack containing paracetamol, ibuprofen, and codeine depending on allergies and medical conditions. Our postoperative analgesia protocol did not include any opioids routinely. There was no routine hand therapy input, and follow-up was usually a telephone call at 6 to 8 weeks by the treating surgeon, although some chose to see patients in person at 2 weeks; in the rare event, nonabsorbable sutures were used.

To assess safety and efficiency, we compared the EAU patient cohort with a historical cohort of patients undergoing CTD performed as a day case in main theater prepandemic. Data were collected on patient demographics and medical comorbidities. Rates of readmission, wound breakdown, and

infection were obtained from electronic patient records. Hospital infection control surveillance reported any cases of positive COVID-19 PCR within 28 days of admission. Efficiency was assessed via information from the electronic theater scheduling system. Costings were assessed under the NHS costing framework (patient-level information and costing system). [12] The costs of performing a session (defined as 4 hours of operating) were calculated for prepandemic day case and EAU pathway.

Patient satisfaction with the EAU pathway was assessed using a questionnaire adapted from the national inpatient survey and reviewed by our local public patient involvement group before distribution. Waiting list times were assessed from the date of referral from primary care to the date of operation. Statistical analysis was performed using IBM SPSS statistics v21. Categorical data were analyzed using the χ^2 test, and continuous data were analyzed by an independent samples *t* test; all results were quoted to 3 significant figures.

Results

In total, 530 procedures were performed in the EAU between December 7, 2020, and May 23, 2021. The breakdown is shown in **Table 1**. The prepandemic day-case cohort was operated between April 2 and July 4, 2019. The demographics and follow-up time for the 2 groups are shown in **Table 2**. There were 139 patients who had 147 CTDs in the EAU, and 13 patients were excluded from the EAU group as they had a further procedure at the same sitting. Ninety-nine patients had 100 CTDs in the day-case group.

Table 1.

Elective Ambulatory Unit Procedures Performed Between December 7, 2020, and May 23, 2021.

Operation	n = 530
Injection	182
Nerve decompression	166
Excision of skin lesion	48
Dupuytren surgery up to dermofasciectomy	46
Release of tendon sheath	24
Autologous blood injection into the tendon	22
Primary fusion joint	17
Excision of bone	16
Wrist scope	4
Removal of metal	3
Joint replacement	2

Table 2.

Summary of Elective Ambulatory Unit Verses Day-Case Patient Cohorts.

	EAU	Day case
Side	Right 80	Right 53
	Left 59	Left 45
	Bilateral 8	Bilateral 1
Age, mean years (range)	66.7 (23-88)	65.4 (34-95)
≥2 Co morbidities	39%	28%
Follow up, mean months	6	28

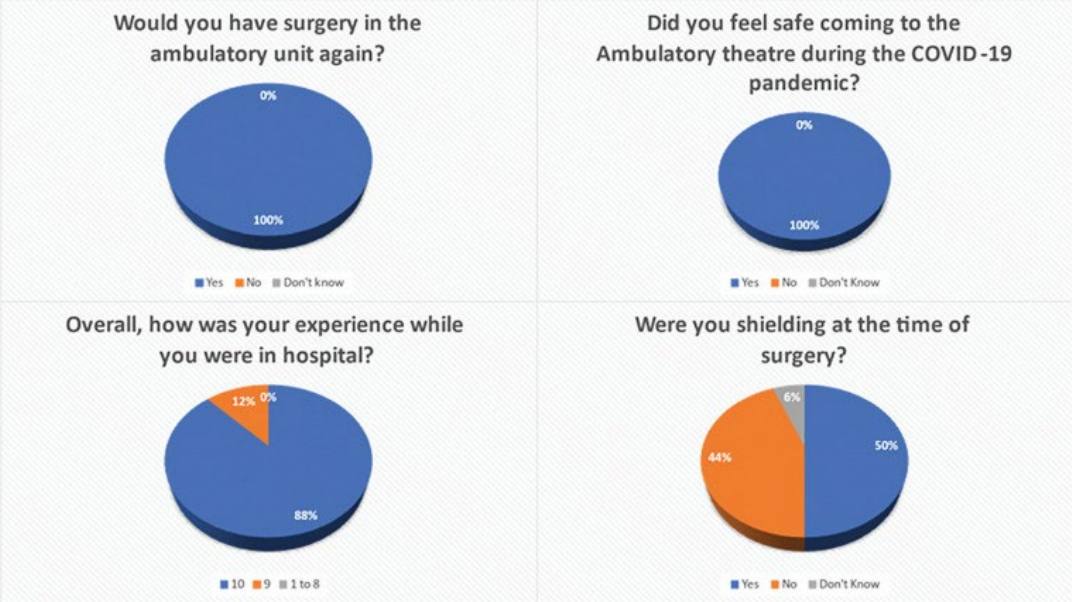
Note. EAU = elective ambulatory unit.

In the 530 cases operated through the EAU, we have not had any adverse medical events or episodes of local anesthetic toxicity. Three cases of vasovagal collapse occurred during either local anesthetic infiltration or intra-articular injection at a risk of 0.56% per procedure.

Of the 147 CTDs performed in EAU, there were 2 complications, both superficial wound infections treated with oral antibiotics. The day-case cohort also had 2 superficial infections, which gave a rate of 1.36% and 2%, respectively. This difference was not statistically significant, *P* = .696. There were no deep wound infections or return to theater in either group. In the day-case cohort, there were 4 other complications, 2 minor wound dehiscence treated with dressings and 2 retained stitches removed under local anesthetic. There was an increase in the number of patients with 2 or more medical comorbidities in the EAU group, 39% from 28%, although this did not reach statistical significance (*P* = .080). A total of 50% of patients who responded to the patient questionnaire said they were shielding at the time of procedure in EAU.

Patient experience and satisfaction was excellent with the EAU pathway receiving 9.8 of 10 on patient satisfaction scores (see **Figure 1**). All patients responded that they felt safe and had no COVID-19-related concerns while attending for surgery in our ambulatory pathway. There were no confirmed cases of COVID-19 contracted by patients or staff since the start of the pathway.

Figure 1



Cost Saving and Efficiency

In terms of efficiency, there was a significantly improved activity through the EAU pathway compared with prepandemic day case. The average theater time for CTDs in the day-case cohort was 47 minutes, whereas in the EAU, these patients are admitted, operated, and discharged all within the 30-minute slot allocated. We were therefore able to increase to 8 patients for a standard 4-hour operating session from 5, meaning a 60% increase in like-for-like cases per session. Before opening the EAU, the average waiting time for CTDs was 36 weeks. This reduced to 12 weeks after the opening of the EAU.

Table 3 outlines the breakdown of costs of performing CTDs in day-case and EAU settings. The results presented are for the last audited set of accounts prepandemic (2018-2019). The department performed 369 CTDs that year. A saving per case of £688 was found, which predicts a total cost saving of £253 872 per year in performing the same number of cases using an EAU model compared with the standard day case.

Table 3.

Cost Analysis of Elective Ambulatory Unit Verses Day-Case Procedures.

Cost	Day-case total cost (£)	Activity	Average cost (£)	EAU total cost (£)	Activity	Average saving (£)
Theater	235 227369	637	146 188369	396	241	
Ward	223 010369	604	138 644369	376	229	
Staff	109 964369	298	29 578 369	80	218	

Drugs	3350	369	9	3350	369	9	0
Other	13 665	369	37	13 665	369	37	0
Total	585 216	369	1586	331 425	369	898	688

Discussion

The EAU was successful in performing 530 procedures. These patients would have faced significant extra delay and therefore potentially worse clinical outcomes. We believe the lessons we have learned and the pathway we have developed can allow local anesthetic only hand surgery to be performed safely away from the main theater environment in the pandemic recovery period and into the future.

Our superficial wound infection rate of 1.36% is higher than in other studies reported in the literature (0.32%-0.7%).[4,13,14] All of our superficial wound infections occurred in patients with multiple medical comorbidities, which is a recognized risk factor. While there were fewer complications in the EAU pathway, we note that during the pandemic, we have reduced the number of follow-up visits. On the EAU pathway, most CTDs were reviewed by telephone at 6 to 8 weeks, rather than in person at 2 weeks for wound review. It could be cases of mild wound dehiscence had settled by the time of review and are not recorded. An increased use of dissolvable sutures in EAU patients may explain why there have been no reports of retained stitches requiring removal. The follow-up time was also shorter in the EAU group, but all complications in both groups were recorded at either 2-week or 6-week follow-up and we would not expect complications such as wound infection to alter with a longer follow-up. The vasovagal events caused an amendment to the standard operating procedure that all interventions including injections were performed on a trolley with the patient supine to allow a Trendelenburg position without the need to transfer. It is our impression there has been no increase in complications with the introduction of the EAU pathway and probably been a significant reduction in such adverse events.

The subject of air exchange to reduce infection risk often arises, especially when new services are developed, in what by nature is a risk-averse NHS. We used a 15-air-exchange-per-hour theater as it was an existing facility and allowed a wide range of procedures to be performed, for example, fusions and arthroplasty. This is likely the format we will use going forward, but for simple soft tissue procedures in the hand, there are numerous reports in the literature of these procedures being performed in an office-based environment without the need for formal air exchange and no increase in infections.[2,15]

Likewise, the need for full prep and drape of the patient versus field sterility is debated, with field sterility being widely used with no increase in the infection rate.[5,6] We have used full prep and drape in both cohorts of patients as we did not wish to change too many aspects of care away from our standard practice at once, especially at a time when all other elective work in our hospital has been stopped except cancer work. We needed to demonstrate that this was a safe service that could continue during what was the current wave of the pandemic and in future waves. It is our ambition, in line with the NHS goal "to be the first net zero national health service," to adopt this lean and green practice of field sterility in the future.[16]

Wide-awake local anesthesia no tourniquet surgery is safe and effective, with little pain beyond the initial injection.[17] Patients reported high levels of satisfaction in other published studies, equivalent to our findings.[7,18,19] We were very pleased and encouraged by our patient feedback with 9.8 of 10

for overall patient satisfaction and all patients saying if they had to have a local anesthetic procedure again, they would choose EAU. We did have some negative feedback about follow-up arrangements suggesting that some patients still like to be seen in person after their surgery and we plan to examine how digital health can improve the follow-up experience in future work.

An unexpected consequence of our COVID-safe pathway was for staff who were unable to work in high-risk areas were able to work in EAU. Many expressed that during the second wave, being able to work in a safe environment and not having to furlough had a positive impact on their mental health. The willingness of patients to come forward and express their satisfaction and feelings of safety (especially those who were shielding) with the measures we have put in place gives confidence and reassurance for continuing surgery in future waves.

We had no issues with accepting high ASA patients to EAU due to the on-site presence of a full resuscitation team. A review by Alser et al of Dupuytren surgery performed in 121 488 patients in England suggested that patients who underwent surgery under general anesthetic have a higher risk of medical complications (myocardial infarction, acute kidney injury, and lower respiratory tract infection) than those operated under local anesthetic only. While rates were low for both cohorts, it should form part of an informed discussion as to the type of anesthetic a patient is offered, especially in cases of multiple medical comorbidities. [20]

The benefits of EAU are also in its efficiency and financial cost savings. We were able to perform more cases with less resource. Our ability to move cases out of a main operating theater list, with the associated anesthetic support, reduced the use of such scarce anesthetic resource at a time of high demand. Our finding of cost saving of approximately 50% through an ambulatory system is in line with other studies in the NHS of such streamlined treatment for hand surgery such as the study by Bismil et al that their experience prepandemic of a 1-stop local anesthetic only service for hand surgery gave their cost saving between 50% and 75% depending on procedure. They combined outpatient review and surgery on the same day, which we did not perform. [21] Reports from other health care systems have shown similar improvements in costs and efficacy.[3,11]

We demonstrated we were able to perform 60% more cases via the EAU pathway. We did not perform a formal time-in-motion analysis to be able to break down exactly where time savings occurred; however, our impression is that there is no difference in surgical time (time from skin incision to wound closure) between the 2 settings but that nonsurgical (time from patient admission to discharge excluding surgical time) time is vastly reduced. Caggiano et al [22] looked at nonsurgical time in CTDs and showed it can vary significantly between anesthetic type and setting. A study by De Boccard et al looked at the theater time required and costs of CTDs and trigger finger split between 4 types of anesthesia: WALANT, LA and torniquet, axillary block, and Bier block. Wide-awake local anesthesia no tourniquet and LA plus torniquet had similar theater room times and costing. The block cases took between 17.5% and 33% more theater time and 21% and 31% more cost per case. [11] There are other indirect health care benefits; by freeing up anesthetic staff from some routine hand surgery lists, they can be redeployed to other lists to tackle the NHS backlog. Grouping local anesthetic only cases together on dedicated lists also means that general anesthetic and block lists can be used for only those cases that require anesthetic support. In further studies, we will look to address the limitations of this study, in that the only direct comparison we could make was on the basis of complications as we did not have historical patient satisfaction or patient-reported outcome measure data. Future studies will also look at the wider health care and social implications of this type of surgery in the different settings.

The financial crash of 2008 has given rise to a trend of increased waiting times for surgery and slowing in the growth of NHS funding as shown by the reduction in health spending as a proportion of gross domestic product.[23,24] This has then been exacerbated by the pandemic. It is inevitable to clear the backlog of cases that the NHS will have to do more with the same resources. The recently published "The Royal College of Ophthalmologists and Get It Right First Time Cataract Hubs and High Flow Cataract Lists," March 2021, gives a template for the provision of low-complexity high-volume surgery. The most common hand and wrist surgical procedures, trigger finger, CTDs, ganglion excision, and operations for Dupuytren disease could all benefit from referral, assessment, and surgical management being optimized to allow an increase in the number of cases performed without increasing the resources required. The use of nonmain theaters will also be essential in tackling the backlog, be this space in clinic that can be converted to allow simple procedures as outlined above or procedure rooms in community health centers. Guidelines for suitable settings and procedures have recently been published by the British Society for Surgery of the Hand in conjunction with Getting It Right First Time. [25]

Elective ambulatory unit provides a template to perform high-volume low-complexity hand and wrist surgery in a safe, efficient, and cost-effective manner. This type of service will be vital to tackle record waiting lists while making best use of funding in a single-payer system.

Footnotes

Contributed by

Author Contributions: Edward Jeans is the primary author and performed data collection, analysis, and article preparation. Sumedh Talwalkar performed data collection and article preparation. Tadesse Gebrye and Francis Fatoye provided references and edited each version of the article. Gillian Yeowell performed data analysis and edited each version of the article. Mike Hayton is the lead author and performed study design and article preparation. All authors have contributed to the collection and analysis of data and the preparation of the article in line with editorial guidelines.

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