



Assessing the standard of emergency general surgical (EGS) operation notes in accordance with the Royal College of Surgeons guidelines

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ABSTRACT

Objective: Operation notes are important for care in surgical patients. The objectives of this study were to analyze the emergency general surgery (EGS) operation note documentation in accordance with the Royal College of Surgeons of England (RCSEng) guidelines and to assess the impact of creating awareness of the guidelines and effect of a new proforma.

Material and Methods: A retrospective review of 50 EGS operation notes was conducted between December 2019 and March 2020 and compared to RCSEng guidelines. Education was delivered on the importance of documentation in accordance with RCSEng guidelines. A new electronic proforma was introduced. A further 50 EGS operation notes were analysed between August 2020 and December 2020.

Results: One hundred operation notes were reviewed, and each given a score out of 19. Our interventions showed significant improvement to the average score (15.64 vs 17.96; $p < 0.001$). Within the second cycle, there was a statistically significance difference when comparing electronic to handwritten notes (18.55 vs 17.50; $p = 0.001$).

Conclusion: Implementation of the new proforma showed improvement in operation note documentation when compared to the RCSEng standard. Therefore, this study emphasizes the need for surgeons to familiarize themselves with the current guidelines.

Keywords: Emergency general surgery, operation notes, royal college of surgeons, audit, electronic operation notes

INTRODUCTION

Accurate documentation of an operation note is an essential tool for patient safety, post-operative care, and medico-legal evidence (1). Post-operative care instructions provide clear guidance for the wider team, whilst also acting as a reference point in future discussions about a patient's health (1). As a result, the importance of maintaining good documentation in an operation note cannot be underestimated (2).

Providing an accurate record of an operation is a duty of every surgeon (3). The General Medical Council (GMC) states that doctors must record work clearly, accurately, and legibly (3). The Royal College of Surgeons England (RCSEng 2022) states that surgeons must ensure that accurate, comprehensive, legible, and contemporaneous records are maintained of all their interactions with patients (4). Unfortunately, mistakes in documentation still occur in different medical specialties with clinical and medico-legal consequences (5). The National Confidential Enquiry into Patient Outcome and Deaths (NCEPOD) detailed that there were discrepancies between the standard of operation notes (6). In 2009, documentation was analyzed regarding patient care for those who died within four days of being admitted to the hospital in the NCEPOD report. A continuous finding was that poor documentation was consistently found in all aspects of patient management (7).

A prospective closed-loop audit was undertaken at a UK District General Hospital because it was noted that key information, outlined by the RCSEng guidelines, was lacking in many operation notes.

In our institution, current practice is to complete handwritten operation notes on a blank pink paper. Operation notes pertaining to emergency general surgery

Cite this article as: Zuberi S, Mustaq Y, Ijaz A, Sundar S, Mohamedali Z, Patel K, et al. Assessing the standard of emergency general surgical (EGS) operation notes in accordance with the royal college of surgeons guidelines. Turk J Surg 2024; 40 (1): 11-18.

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Received: 01.08.2023

Accepted: 16.01.2024

Available Online Date: 23.03.2024

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DOI: 10.47717/turkjsurg.2024.6194

(EGS) were selected in this study as this is a high-risk proportion making up more than one-third of all general surgical admissions (8). These complex surgeries carry eight times high mortality compared to elective surgical admissions (9). Poor records can potentially have medico-legal ramifications as well as effecting patients care which is increasingly becoming more relevant in today's litigious climate (9).

Our primary aim was to assess the standard of EGS operation notes in accordance with the RCSEng guidelines at a single district general hospital. Our secondary aim was to evaluate the impact of the new electronic operation note proforma and raising awareness of the RCSEng guidelines on the standard documentation.

MATERIAL and METHODS

EGS operative notes were deemed as those operations conducted in the emergency theatres. The emergency team involves the general surgical team (consultant, registrar, and senior house officer), anesthetic team (consultant and registrar), scrub nurses and operating department practitioners (ODP). A record of EGS operations with patient hospital number was retrieved from hardcopy documentation kept in emergency theatres. Patient operative notes were accessible by the patient electronic system. Notes were examined by a single reviewer.

A retrospective 1st cycle audit of 50 consecutive EGS operative notes between December 2019 to March 2020 were carried out. Each operative note was examined against the RCSEng guidelines giving a score out of 19. A full checklist can be found in Table 1.

The findings were presented at our general surgical clinical governance meeting (CGM) with the audience including surgeons at all levels. The results were discussed in detail and areas of consistent deficiency were identified. Awareness was generated about the importance of good documentation and what RCSEng requires to be included in the operation notes. A new electronic operation note proforma was accepted by the senior clinical team. Prior to this point electronic medical records had not been used during emergency surgery.

The electronic proforma is a Microsoft word-based document which is accessible on the trusts shared drive. It provides pre-filled generic information such as time and date. In addition, it prompts surgeons to complete all sections of the proforma by filling in boxes. An example of the proforma can be found in Figure 1.

An action plan was agreed to conduct a re-audit following this intervention. Clinicians were given the option whether to complete operation notes against the RCSEng standards via a handwritten or electronic proforma. An option was given as not all senior consultants felt comfortable writing notes electronically. To complete handwritten proforma's, clinicians would simply print out the template from the trusts shared drive and fill in the proforma via hand.

Table 1. Table of the Royal College of Surgeons England good practice guidelines

Royal College of Surgeons England good practice guidelines	
1	Date
2	Time
3	Elective/emergency procedure
4	Operating surgeons
5	Theatre assistants
6	Theatre anesthetists
7	Operation procedure carried out
8	Incision
9	Operative diagnosis
10	Operative findings
11	Any problems/complications
12	Any extra procedure performed
13	Reason why it was performed
14	Details of tissue removed, added or altered
15	Identification of any prosthesis used
16	Details of closure technique
17	Anticipated blood loss
18	Detailed postoperative care instructions
19	Signature

Posters of the RCSEng guidelines were placed in emergency theatres reminding surgeons what should be detailed. The electronic version had to be approved by the IT team before the second cycle was conducted to ensure that the notes were being uploaded and filed correctly on the hospital system. The second audit cycle was conducted between August 2020 and December 2020 which included a mixture of handwritten and electronic operative notes.

Statistical Analysis

Statistical analysis was performed using Statistical Package for the Social Sciences version 29.0. Mann-Whitney U test was used with statistical significance set at $p < 0.05$.

RESULTS

The first cycle was conducted between December 2019 to March 2020 where 50 EGS handwritten operation notes were reviewed. The average score against the RCS guidelines was 15.64/19 (82.31%). No record fulfilled all RCSEng criteria. The most common error was anticipated blood loss which was only documented in 2% of operation notes. Other common errors included name of theatre assistant (58%) and if the procedure was performed in an emergency/elective setting (20%).

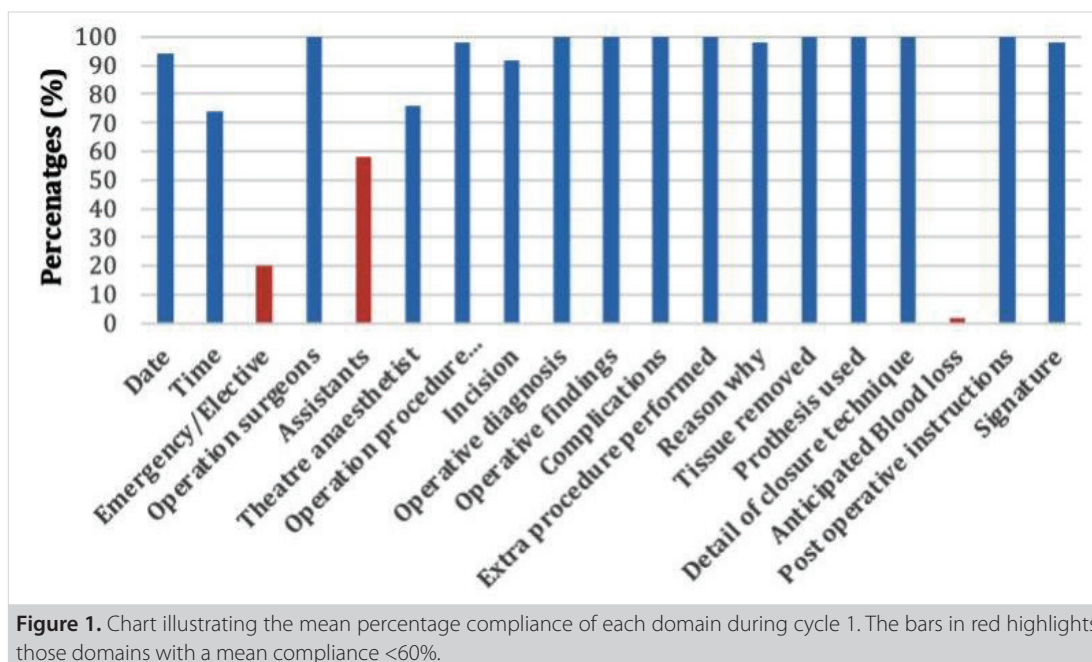


Figure 1. Chart illustrating the mean percentage compliance of each domain during cycle 1. The bars in red highlights those domains with a mean compliance <60%.

All notes audited in this first cycle included the name of operating surgeon, operative diagnosis, operative findings, any problems/complications, any extra-procedure performed/reason why it was performed, details of tissue removed/added/alterd, identification of any prosthesis used, details of closure technique and detailed postoperative care instructions. A graph of the first cycle results is shown in Figure 2.

The second cycle was conducted between August 2020 to December 2020 where a further 50 EGS operation notes were reviewed with an average compliance score of 17.96/19 (94.53%). The three most common areas missed in the first cycle showed significant improvement in the second cycle. Documentation of theatre assistants involved in the procedure (58% vs. 98%), anticipated blood loss (2% vs 62%) and specific mention of whether the operation was emergency/elective procedure (20% vs 86%). Figure 3 illustrates the improvements between the 1st and 2nd cycle in these three domains.

Twenty-six out of 50 operation notes analyzed in cycle two scored 19/19 (100%) when measured against the guidelines compared to zero out of 50 during the first cycle. Surprisingly, there was a small decline noted in categories such as time, tissue removed, prosthesis used, details of closure technique and post-operative instructions post-intervention. Table 2 and Figure 4 illustrate the comparisons between the 1st and 2nd cycle for each domain.

Within the re-audit, we compared the electronic operation notes (n= 22) with handwritten notes (n= 28). The mean score of electronic notes was 18.55/19 (97.61%) compared to 17.5/19


(92.11%) of handwritten notes, which was statistically significant (p= 0.001). Eighteen out of the 22 typed operation notes received 19/19 whilst this was only demonstrated in eight out of 28 handwritten notes. Figure 5 illustrates the comparison between handwritten and electronic documentation during the second cycle.

DISCUSSION

The accuracy of operation note documentation is extremely important for the delivery of care. The notes are not just vital for documenting intra-operative findings or communicating post-operative plans but also act as a legal record of an operation (10). In this closed loop audit, the first cycle demonstrated that 50 EGS operation notes had an average score of 15.64/19 (82.31%) when assessed against the RCSEng guidelines.

A previous study assessed the quality of operation notes and found that the RCSEng guidelines were not followed properly (11). During the second cycle, the intervention of raising awareness about the guidelines and creating a proforma was effective in improving the average score per operation note to 17.96/19 (94.53%). Electronic documentation when compared to handwritten documentation was far superior with the operation notes receiving an average score of 18.55/19 (97.61%) when measured with the guidelines.


The first cycle highlighted clear areas for improvement such as documenting anticipated blood loss (2%) and stating whether it is an emergency/elective procedure (20%).



Surgical Operation Notes
All documents **MUST** show the Patient's NHS Number

Patient name:
Gender:
DOB:
Address:
NHS number:
Hospital number:

Date and Time of Operation: 8/1/23 11:49 AM Theatre Room: Choose an item.
Responsible Consultant: Procedure type: Choose an item.
Name of Operating Surgeon: Type of Anesthetic: Choose an item.
Name of Assistant(s):
Name of Anaesthetic(s):
Operation:
Findings and Procedure:
Incision and steps:




Surgical Operation Notes
All documents **MUST** show the Patient's NHS Number


Patient name:
Gender:
DOB:
Address:
NHS number:
Hospital number:


CONTINUED:

Closure technique: Est. Blood loss: Choose an item.
Any Specific Problems or Additional Procedures: Choose an item.
Any Histopathology or Microbiology sent:
Any Prosthesis or implanted devices used:
Post-Operative Instructions (including Diet, Medications, Follow-up arrangements and expected discharge date):
Documenting Surgeon: Signature:



PF-002499-003 Surgical Operation Note Proforma-V1.0_14092020-Page 1 of 2





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Figure 2. New electronic pro forma.

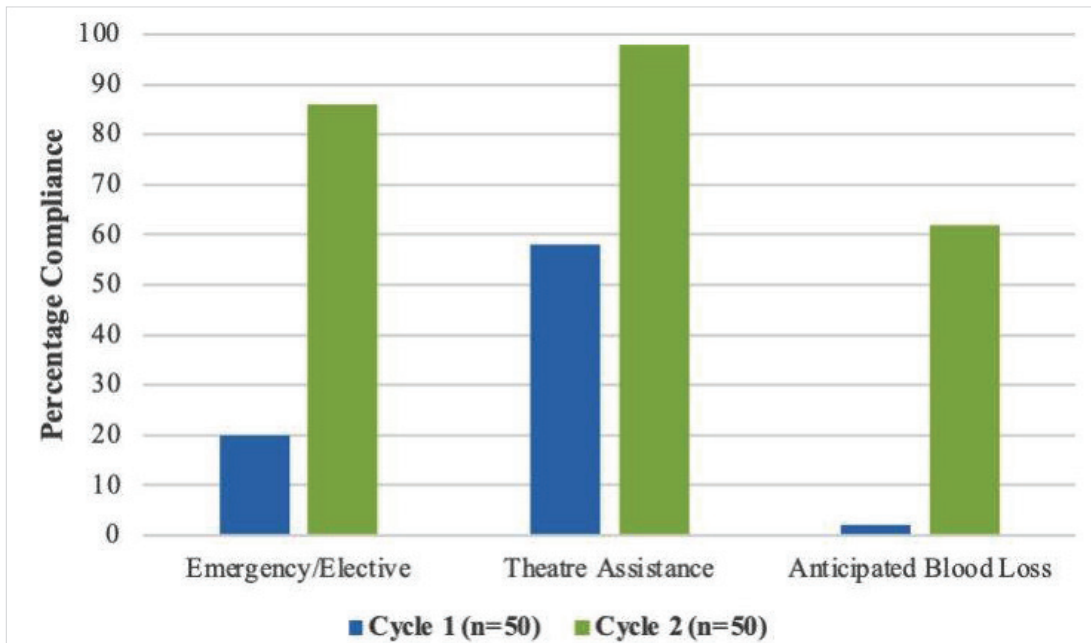
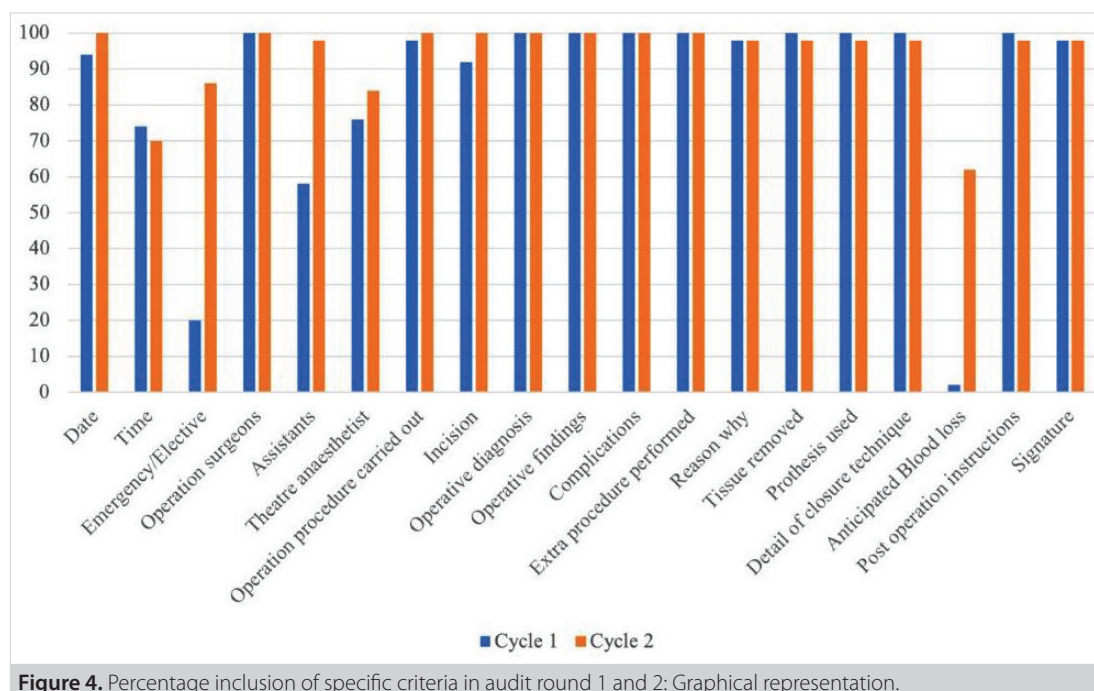
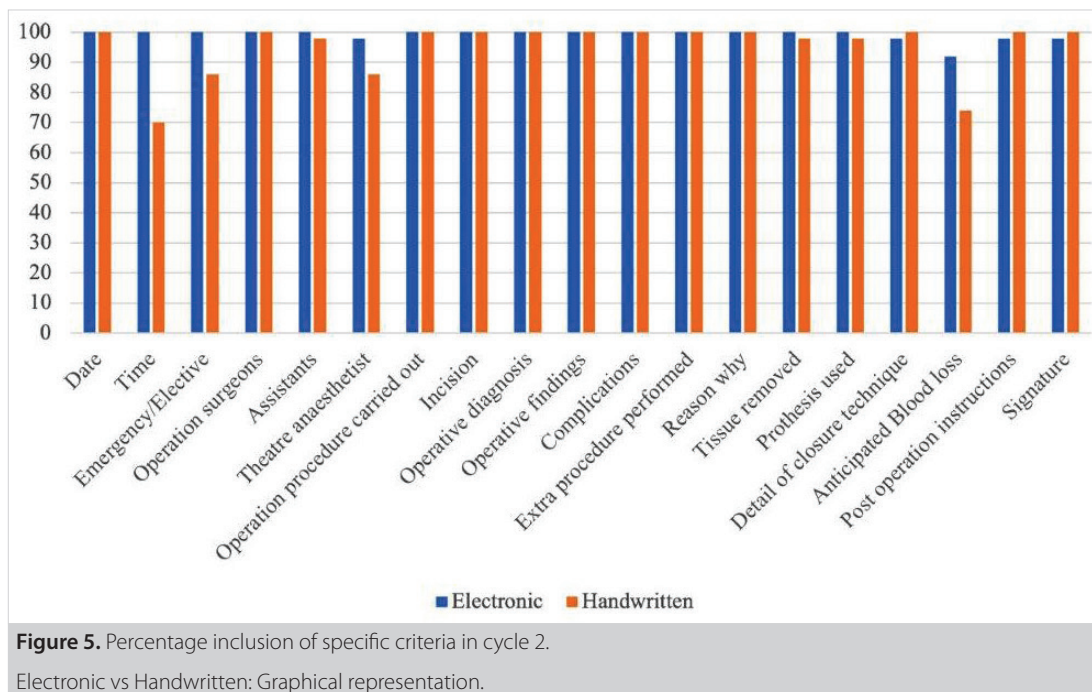


Figure 3. Chart comparing the results of both cycles for documentation of emergency or elective, theatre assistance and anticipated blood loss.

Table 2. Table of comparison of percentage compliance between 1st and 2nd audit cycles

Domains	1 st cycle, %	2 nd cycle, %
Date	94	100
Time	74	70
Emergency/elective	20	86
Operating surgeons	100	100
Theatre assistants	58	98
Theatre anaesthetist	76	84
Operation procedure carried out	98	100
Incision	92	100
Operative diagnosis	100	100
Operative findings	100	100
Complications	100	100
Extra procedure performed	100	100
Reason why	98	98
Tissue removed	100	98
Prothesis used	100	98
Detail of closure technique	100	98
Anticipated blood loss	2	62
Post operative instructions	100	98
Signature	98	98

**Figure 4.** Percentage inclusion of specific criteria in audit round 1 and 2: Graphical representation.



Following intervention, the second cycle showed significant improvement in documentation of anticipated blood loss (62%) and whether the procedure was emergency/elective (86%). These findings are comparable to a similar audit by Bozbiyik et al. in 2020 where their first cycle of 150 operation notes revealed 0% documentation rate for both anticipated blood loss and emergency/elective procedure. After the introduction of a proforma, the documentation rate for blood loss rose to 34% and for emergency/elective documentation rates increased to 28.67% (12). In comparison, our study reveals a much more significant impact of the proforma, albeit in a smaller sample study. A similar study focusing on improvements in pre- and post-intervention revealed significant improvement in documentation of estimated blood loss (2% to 73%, $p < 0.0001$) and elective or emergency procedure (1% to 83%, $p < 0.0001$) (13).

Documentation of estimated blood loss in our study and in literature fails to reach $>90\%$. Visual estimation is the most used method for recording intraoperative blood loss and is generally performed poorly in the operating theatre (14). A systematic review by Tran et al. (2020) found that visual estimated blood loss was underestimated in 12 out of 13 studies (15). We believe there is poor compliance with documentation of estimated blood loss as many surgeons feel they only need to document it when there has been a significant amount of blood loss or because some are unaware of its inclusion in the operation notes.

It is known that the use of electronic databases and proformas are important to increase the quality of operation notes (16).

The implementation of an electronic proforma was to help facilitate accurate documentation targeting the three main faults detected in the first cycle: Anticipated blood loss, assistants and emergency/elective procedure. This also eliminates the potential illegibility as incomplete and illegible hand-written notes often weaken a doctor's defense in court (17). Our findings show that electronic documentation was far more accurate compared to handwritten documentation in 17 out of the 19 domains. A full breakdown is found in Figure 5. In 2010, Barritt et al. demonstrated that computerized proformas can reduce differences between operation reports for the same procedure and facilitates reports tailored to the RCSEng guidelines (18). As a result, there is enough evidence to say that electronic documentation can be considered as gold standard; however, this option is still unfeasible for some hospitals (19). For these hospitals, aide-memoire sheet placed on the operation sheet or a poster in theatre has been shown to be effective (20,21).

A small negative impact of our interventions was noted between the 1st and 2nd cycle in five domains such as: Time (-4%), tissue removed (-2%), prosthesis used (-2%), detail of closure technique (-2%) and post-operative instructions (-2%). It should be noted that the later four domains all had a 100% compliance rate during the 1st cycle, and it can be a challenge to maintain flawless standards even with the introduction of an intervention. Most mistakes were made in handwritten notes as 18 out of 22 typed notes had 100% compliance compared to 8 out of 28 handwritten notes, further supporting the superiority of typed notes. Similar studies have noted a decrease in

compliance in different domains after an intervention. In 2022, Shah et al. noted a -4% reduction in compliance of signature despite a prompt box on their proforma. This supports the need to re-audits and amend our proforma if necessary. In addition, the use of electronic notes versus handwritten notes should be emphasized in future CGM.

Teaching on how to write accurate operation notes is limited. Borchert et al. have shown that there is little importance placed on how to write operation notes from medical school and surgical training programmes (22). There is no evidence of formal education on how to write an accurate and reliable operation note (18). We would advise local trusts introduce teaching on the importance and method of writing accurate medical notes.

Limitations

Type 2 error can occur due to our small sample size, and larger studies are required to validate our findings. However, when compared to similar studies, our sample size is comparable (23). Moreover, this study was only carried out across one surgical specialty and for consistency, further audits should be conducted across different surgical specialties. In addition, the RCSEng operation note guidelines cannot be applied to every specialty. For example, the use of prosthesis is rare in a general surgical list but is more commonly used in a trauma and orthopaedic list. Knowing the distribution or breakdown of surgeries between cycles when assessing future standards of operation notes would be important as the accuracy of documentation can vary depending on the complexity of case. We therefore recommend the use of procedure-specific proformas can be introduced as they have been shown to improve standards for hemi-arthroplasty, laparoscopic cholecystectomy and in burns surgery (18).

CONCLUSION

In conclusion, this study shows that the quality of operative note taking improves when raising awareness amongst surgical staff. Furthermore, the use of an electronic proforma compared to handwritten is far superior. We recommend that all surgical departments should incorporate a simple electronic proforma. Continuous auditing and the introduction of an electronic version can ensure there is a high uniform standard of operative note recording.

Further studies will be needed to assess the effectiveness of making specific guidelines relating to different surgical specialties.

Ethics Committee Approval: The authors have received institutional permission to proceed with the study. Approval was provided in a letter uploaded to the Journal's official system on 21.12.2023.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - ACE, ME, KD; Design - ACE; Supervision - MK; Fundings - All authors; Data Collection and/or Processing - ACE, ÖE, ARP; Analysis and/or Interpretation - ACE, KS; Literature Search - ACE; Writing Manuscript - ACE, MT; Critical Reviews - MK.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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ORIJİNAL ÇALIŞMA-ÖZET

Turk J Surg 2024; 40 (1): 11-18

Acil genel cerrahi (EGS) ameliyat notlarının standardının *Royal College of Surgeons* kılavuzlarına uygun olarak değerlendirilmesi

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ÖZET

Giriş ve Amaç: Ameliyat notları cerrahi hastaların bakımı için önemlidir. Bu çalışmanın amacı, acil genel cerrahi (EGS) ameliyat notu dokümantasyonunu İngiltere *Royal College of Surgeons* (RCSEng) kılavuzlarına göre analiz etmek ve kılavuzlar hakkında farkındalık yaratmanın ve yeni bir proforma kullanımının etkisini değerlendirmektir.

Gereç ve Yöntem: Aralık 2019 ve Mart 2020 tarihleri arasında 50 EGS ameliyat notunun retrospektif incelemesi yapılmış ve RCSEng kılavuzlarıyla karşılaştırılmıştır. RCSEng kılavuzlarına uygun dokümantasyonun önemi konusunda eğitim verilmiştir. Yeni bir elektronik proforma tanıtılmıştır. Ağustos 2020 ile Aralık 2020 arasında 50 EGS operasyon notu daha analiz edilmiştir.

Bulgular: Yüz ameliyat notu incelendi ve her birine 19 üzerinden bir puan verildi. Müdahalelerimiz ortalama puanda önemli bir iyileşme göstermiştir (15,64'e karşı 17,96; $p < 0,001$). İkinci döngüde, elektronik ve el yazısı notlar karşılaştırıldığında istatistiksel olarak anlamlı bir fark vardı (18,55'e karşı 17,50; $p = 0,001$).

Sonuç: Yeni proforma uygulaması, RCSEng standardına kıyasla ameliyat notu dokümantasyonunda iyileşme göstermiştir. Bu nedenle, bu çalışma cerrahların mevcut kılavuzlara aşına olmaları gerektiğini vurgulamaktadır.

Anahtar Kelimeler: Acil genel cerrahi, ameliyat notları, kraliyet cerrahlar koleji, denetim, elektronik ameliyat notları

DOI: 10.47717/turkjsurg.2024.6194