

Are Orthopaedic Postoperative Care Instructions Detailed Enough

L. Low, M.N. Baig, R. See, H. Elkhwad, C. Egan.

Department of Trauma and Orthopaedics, Galway University Hospital, Co. Galway, Ireland.

Abstract

Introduction

Good documentation of orthopaedic post-operative care instructions is crucial for the seamless transfer of patient care from the operating room to the outpatient clinic. We aim to audit our practice of post-op instruction documentation.

Methods

Departmental standards were set based on the Royal College of Surgeons (RCS) Good Surgical Practice (GSP) guidelines and a survey completed by all orthopaedic consultants in this tertiary referral hospital. An closed loop audit was undertaken for all orthopaedic trauma surgeries with the introduction of a printed proforma and education.

Results

In cycle one, only four parameters had a compliance rate > 80% in comparison to cycle two, where 17 parameters achieved a compliance rate > 80% with the printed proforma. The standards with the most notable improvements in documentation compliance included specifying the name of antibiotics to be given (19% to 91%, $p < 0.0001$), duration of venous thromboembolic (VTE) prophylaxis (0% to 67%, $p < 0.0001$), type of dressing applied (3% to 82%, $p < 0.0001$), and duration of postoperative weight-bearing status (17% to 90%, $p < 0.0001$).

Discussion

The introduction of a novel printed postoperative instructions proforma serves as a checklist when writing the operative note. This can easily be replicated across other orthopaedic centres with minimal cost implications.

Introduction

Good documentation of orthopaedic post-operative care instructions is paramount for the seamless and safe transfer of patient care from the operating room to the outpatient clinic. Apart from the

primary surgeon and assistants, the majority of the healthcare professionals involved in a patient's post-operative management, e.g. ward and outpatient nurses, physiotherapists, and other non-consultant hospital doctors (NCHDs) heavily rely on the post-operative care instructions. The Good Surgical Practice guidelines recommend that operative notes should give sufficient detail to enable continuity of care by another doctor¹. Good note-keeping is pertinent to ensure that patients receive the appropriate multi-disciplinary management in a timely fashion. Conversely, poorly documented instructions cause significant confusion in the patient care pathway from the operative room to the outpatient clinic. High-quality notes are also important from a medicolegal perspective to protect doctors from litigations², in addition to providing accurate information for research and audit purposes³. An audit by Lefter et al demonstrated that up to 45% of operative notes were indefensible in a potential court case due to illegibility and incompleteness of notes⁴.

In a British Medical Journal (BMJ) article "How to write an operation note", the authors have outlined that the postoperative instructions section should include pertinent points such as venous thromboembolism prophylaxis, investigations requiring follow-up such as sample sent for microscopy or histology, further antibiotics if required, clearly specified follow-up instructions, dressing changes suture removal, and documentation of the surgeon's name and medical council number⁵. This is the first study, to our knowledge, introducing a novel postoperative note proforma and assessing the quality of documentation of orthopaedics postoperative care instructions using a set of standards adapted from the 2014 Royal College of Surgeons (RCS) Good Surgical Practice (GSP) guidelines, the aforementioned BMJ article and a consultant consensus survey.

Methods

A departmental standard for orthopaedic post-operative care instructions was established based on the 2014 Royal College of Surgeons (RCS) Good Surgical Practice (GSP) guidelines¹, a BMJ article on "How to write an operation note"⁵ and a consultant survey among ten orthopaedic consultants. This consists of nine headings for monitoring of neurovascular status, postoperative antibiotics, analgesia, DVT prophylaxis, postoperative investigations, dressing, mobility, follow-up plans, surgeon's signature and medical council number, as well as routine observation and monitoring of circulation, motor and sensation (CMS).

An audit of the postoperative instructions on orthopaedic operation notes was undertaken for all orthopaedic trauma surgeries over a 10-day period (n=38) in this orthopaedic unit. All elective cases were omitted from the audit. The second cycle was performed to complete the loop following introduction of a printed postoperative instructions proforma and education (n=36). A multi-prong intervention took place following the first audit cycle.

First of all, clinician education in the form of a presentation aimed at both orthopaedic NCHDs and consultants alike. Results of the first audit cycle and current best practice guidelines were highlighted at the department's weekly meeting. Concurrent education sessions for recovery, ward and outpatient nurses for familiarisation with the proforma were also undertaken. In addition to that, the nine standards consisting of 23 parameters of post-operative care instructions were printed, laminated, and displayed throughout theatres as a reminder to surgeons writing the note. Finally, a novel postoperative instruction proforma was printed behind blank sheets of operative notes (Figure 1).

The practice was re-audited over ten days. Statistical analysis was performed using GraphPad Prism 9, Version 9.2.0 (GraphPad Software, Inc., San Diego, CA). The two-tailed Fisher's exact test was applied to each standard. A p-value of <0.05 was considered statistically significant.

Results

In both cycles, the breakdown of authors of the operative notes remained largely similar with 63% (n=24) of notes written by registrars, while only 26% (n=10) and 16% (n=6) were written by consultants in cycles one and two respectively (Table 1). All 23 parameters of the 9 major standards audited demonstrated improvement in compliance in the 2nd audit cycle, with differences ranging from 15% to 79% (Table 2, Figure 2). 18 of the 23 parameters were of statistical significance ($p < 0.05$).

In cycle one, only four parameters had a compliance rate > 80% in comparison to cycle two, where 17 parameters achieved a compliance rate > 80% with the printed proforma. The standards with the most notable improvements in documentation compliance included specifying the name of antibiotics to be given (19% to 91%, $p < 0.0001$), duration of venous thromboembolic (VTE) prophylaxis (0% to 67%, $p < 0.0001$), the type of dressing applied (3% to 82%, $p < 0.0001$), and the duration of postoperative weight-bearing status (17% to 90%, $p < 0.0001$). Overall improvement in documentation compliance was noted especially on the date of follow-up appointment, if an X-ray, wound review or new cast / dressing / brace is required at follow-up and the order of the aforementioned instructions. Standards that showed marginal improvements but did not achieve statistical significance included the duration of postoperative antibiotics (76% to 91%, $p = 0.2317$), VTE prophylaxis being mentioned where indicated for lower limb procedures resulting in reduced postoperative mobility (83% to 100%, $p = 0.2286$), the type of VTE prophylaxis (44% to 78%, $p = 0.0858$), specification of weight-bearing status (83% to 100%, $p = 0.08393$), and surgeons medical council number (37% to 86%, $p = 0.6151$) (Table 3).

Discussion

In the realm of orthopedic surgery, maintaining high-quality patient care and effective communication within the surgical team is paramount. A key aspect of this communication is the documentation of post-operative instructions in operative notes. Traditionally, post-operative instructions have been recorded in a freehand manner on a sheet of paper, leaving room for variability, illegibility, and potential misinterpretation. However, the implementation of a standardized printed proforma for post-operative notes offers several distinct advantages over handwritten notes.

Recommendations by the RCS 'Good Surgical Practice' 2014 guidelines have made clear what is expected to produce clear, accurate and robust operation notes¹. The idea of using structured proformas instead of free-hand written sheets is not new and has been successfully implemented primarily in surgical admission notes. In many hospitals, a standardised blank operative note sheet is used across various specialities. Prior studies using procedure-specific proformas, for example, laparoscopic appendectomy-specific proforma utilised by Abbas et al, have demonstrated significant improvement in operation note compliance with the RCS guidelines^{6, 7}. However, the pragmatism of having individual procedure-specific printed proformas for various orthopaedic procedures may not be readily implementable, especially in healthcare settings that rely on handwritten patient records. Instead, we have chosen to focus on the post-operative instructions that are generally similar across most orthopaedic procedures. Common issues in postoperative orthopaedic patients in a trauma ward revolve around VTE prophylaxis, postoperative antibiotics, weight-bearing status and follow-up plans. These instructions should be clearly documented, however, are easily overlooked especially in a time-constrained trauma theatre environment. Similarly, the orthopaedic proforma used in Sheffield also highlighted how speciality-specific headings improved operation note documentation^{6, 8}.

Published literature has consistently highlighted the benefits of standardized proforma documentation in various medical specialities. Structured reporting with the use of proforma templates significantly reduced documentation errors and enhanced the overall readability of medical records. This positively impacted patient care by ensuring that critical information was accurately recorded and easily accessible to healthcare professionals involved in the patient's care⁹⁻¹¹.

In addition to that, proforma notes have been shown to expedite the discharge process and improve patient compliance with post-operative instructions. Just as the intensive care unit environment benefits from a streamlined handover process, the department stands to gain substantially from the consistent and comprehensive documentation facilitated by proforma notes. The focus on

operational sustainability and team performance enhancement seamlessly applies to orthopaedics, where standardized documentation contributes to patient safety, seamless care continuation, and proficient communication among diverse healthcare teams. By integrating the insights from this paper into orthopaedic practice, the integration of a printed proforma not only aligns with RCS GSP guidelines, but also nurtures an environment conducive to excellence in patient care, error reduction, and optimized interprofessional communication^{12, 13}.

The Good Surgical Practice guidelines also recommend that all operations notes should be preferably typed¹. The variable legibility of the handwritten operation notes is a big motivating factor for a transition to electronic notes. Ghani et al. in 2014 piloted an electronic operation note system for orthopaedic trauma operation notes. They demonstrated statistically significant improvement in the information detail and readability of operation notes, with a 100% legibility rate compared with only 66% of the handwritten notes¹⁴. In addition to that, electronic operation notes are more versatile than handwritten notes as they can be readily accessed remotely for auditing and research purposes. This also allows for multiple procedure-specific orthopaedic operation notes in prose form to be implemented without creating significant clutter in the operating room. Lastly, electronic notes are less susceptible to getting lost as compared to paper notes of which the latter has no method of reproducing the information contained⁶. While electronic operation notes are becoming increasingly ubiquitous in certain centres, many more centres without the same financial resources and facilities continue to rely on handwritten notes. We have demonstrated that with simple interventions such as a printed proforma for postoperative instructions, education to the relevant stakeholders and a poster to serve as a reminder to the author of the operative note, the quality of postoperative instructions can be improved dramatically. Besides being easily implemented, the cost for a simple and well-designed pathway has minimal cost implications of approximately 5-10 cents per page¹⁵.

The limitation of this study includes a small sample size between the allotted data collection periods. Only a total of 74 operative notes were analysed. Nevertheless, the implantation of a printed postoperative note proforma yielded a statistically significant improvement. Although no cost analysis was performed, the printing costs of the proforma was negligible.

However, the general improvement in various parameters of the postoperative orthopaedic instructions highlights the potential of a proforma to aid with the completeness of written post-operative instructions. This has improved the timeliness of care being provided at individual points of a patient's care pathway with less surrounding doubt of causing more harm than good, e.g. weightbearing status and requirement of thromboprophylaxis. High-quality notes can evidently drive the improvement of patient care beyond morbidity and mortality figures, but also identifies gaps such as unnecessary post-operative antibiotics¹⁵⁻¹⁷.

The introduction of a novel printed postoperative instructions proforma serves as a checklist for the surgeon writing the operative note. Our results show a vast improvement in the quality of notes overall, decreasing the likelihood of missing out on important postoperative care instructions as compared to freehand written notes. This can easily be replicated across other orthopaedic centres with minimal cost implications.

Declarations of Conflicts of Interest:

None declared.

Corresponding Author:

Lyndon Low,
Department of Trauma & Orthopaedics,
Galway University Hospital,
Co. Galway,
Ireland.

E-Mail: lowl@tcd.ie

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Table 1: Breakdown of the authors of the operative notes

	Cycle 1		Cycle 2	
	n = 38	%	n = 36	%
Consultant	10	26	6	16
Registrar	24	63	24	63
Senior House Officer	4	11	6	16

Table 2: Operations Performed

Site	Procedures	Cycle 1 (n=38)	Cycle 2 (n=36)
Metacarpal / Digits	MUA and K-wires	5	1
Hip	Hemiarthroplasty / DHS / IM nail	10	6

Femur	ORIF / IM nail	2	5
Knee	Posterolateral corner repair	0	1
Quadriceps	Tendon repair	0	1
Tibia	MUA and cast	0	1
Ankle	ORIF	3	4
Hallux	MUA and K-wires	0	1
Humerus	ORIF	1	3
Olecranon	ORIF	0	1
Ulna	ORIF	0	1
Radius and ulna	MUA and K-wires / ORIF	6	0
Distal radius	MUA and K-wires / ORIF	8	7
Scaphoid	ORIF	1	2
Spine	ACDF	1	0
	Kyphoplasty	0	1
	Decompression	0	1
Others	Lower limb wound washout	1	0

Table 3: Results and statistical analysis of compliance with standards in cycles 1 and 2 of the audit

Standard	Cycle 1			Cycle 2			p-value
	Yes	No	%	Yes	No	%	
Monitoring circulation, motor, sensation (CMS)	25	13	66	32	4	89	0.0264
Post-operative antibiotics (where indicated)							
Mentioned	17	4	81	23	0	100	0.0441
Name of antibiotic	4	17	19	21	2	91	<0.0001
Duration	16	5	76	21	2	91	0.2317
Analgesia							
Mentioned	17	21	45	32	4	89	0.0002
Venous Thromboembolism Prophylaxis (where indicated)							
Mentioned	15	3	83	18	0	100	0.2286
Type	8	10	44	14	4	78	0.0858
Duration	0	18	0	12	6	67	<0.0001

Post-operative blood test / scans (where indicated)							
Mentioned	11	11	50	15	0	100	0.0009
Timing	10	12	45	13	2	87	0.0164
Dressing							
Type of dressing applied	1	30	3	28	6	82	<0.0001
Check date	4	25	13	17	17	50	0.0031
Date for removal of sutures / clips	11	17	39	30	4	88	<0.0001
Mobility							
Weightbearing status	15	3	83	21	0	100	0.0893
Duration	3	15	17	19	2	90	<0.0001
Outpatient Follow-Up							
Mentioned	27	11	71	35	1	97	0.0032
Date of follow-up	19	19	50	34	2	94	<0.0001
X-Ray where required	23	14	62	27	3	90	0.0114
Wound review	18	11	62	26	7	79	0.1713
New cast / dressing / brace	7	18	28	10	3	77	0.0062
Order of instructions	7	31	18	16	20	44	0.0233
Surgeon details							
Surgeon's name / signature	35	3	92	35	1	97	0.6151
Surgeon's medical council number	14	24	37	31	5	86	<0.0001

Figure 1: Novel postoperative instructions proforma

Postoperative Instructions

Please circle the relevant instructions

1. **Antibiotics:** Indicated? Yes No
 - Type..... Duration.....

2. **DVT Prophylaxis:** Indicated Yes No
 - Type..... Dose..... Duration..... Start.....hrs post-op

3. **Pain medication:** As charted
.....

4. **Post op blood test / Samples for Lab**
 - Indicated Yes No Types.....
 - Date.....

5. **Dressing:**
 - Type..... Check Date if needed
 - ROS date..... / Not required After Care.....

6. **Mobility:**
 - Amount of weight bearing allowed FWB PWB Toe touch NWB
 - Duration **Elevation:** Yes No
 - Physio Instruction

7. **OPD Follow-up**
 - **OPD Date**.....
 - **Wound review** Yes No
 - **New cast/ brace** Yes No
 - **X-Ray** Yes No Type
 - **Order of instruction** XR First New cast/wound review First
 - **Aftercare plan**.....

8. **Monitor CMS**
9. **Additional instruction**.....

10. **Surgeon's signature/name** **Doctor MCN/Bleep**

Figure 2: The percentage of compliance of 23 audit parameters in cycles 1 & 2.

