Original Article

Compliance with preoperative instructions in thoracic surgery: impact of specialized nursing

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Background: Preoperative evaluation and education are cornerstones in ERAS® guidelines, but there are no clear indications on how they should be performed. In this study, we evaluated the role of specialized thoracic surgery nurse-consultation in the compliance with preoperative ERAS® recommendations.

Methods: We designed a pilot case-control study with all the patients submitted to elective thoracic interventions under general anesthesia in Clínica Universidad de Navarra. Patients whose preoperative evaluation was performed by non-specialized nurses were considered controls and patients whose preoperative evaluation was responsibility of fully dedicated thoracic surgery nurses were considered cases. Items of interest were preoperative fasting, chest physiotherapy training, chronic pain prevention, deep venous thromboembolism prophylaxis and antimicrobial gel shower. Compliance with all the items was assessed using case control studies' methodology, 2×2 tables and measures of association.

Results: A total of 122 patients were studied, 37 (30%) controls and 85 (70%) cases. Five patients in each group (14% among the controls and 6% of the cases) did not fast (OR: 2.5, 95% CI: 0.53–11.57, P=0.15). Five (14%) controls were not trained in chest physiotherapy against 3 (4%) cases (OR: 4.27, 95% CI: 0.77–28.70, P=0.05). Nine (24%) controls did not take preoperative gabapentin, opposite to 2 (2%) cases (OR: 13.33, 95% CI: 2.48–130.81, P=0.0003). Low molecular weight heparin was not administered in 9 (24%) controls and in 7 (8%) cases (OR: 3.58, 95% CI: 1.06–12.35, P=0.02). Twelve (32%) controls did not shower with the specific antimicrobial gel, against 10 (12%) cases (OR: 3.6, 95% CI: 1.24–10.44, P=0.006).

Conclusions: Preoperative evaluation and education by fully dedicated, specifically trained thoracic surgery nurses increases compliance with preoperative ERAS® guidelines instructions, especially those related with nurses' intervention.

Keywords: Enhanced recovery after surgery; specialized nursing; lung resection; preoperative instructions compliance

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Introduction

Preoperative evaluation and information prior to lung resection are cornerstones in enhanced recovery pathways after surgery (1) and in multidisciplinary approaches to thoracic surgery (2). Preoperative recommendations have been well defined in some specialties, as Anesthesiology (3), but it remains unclear who is the most appropriate professional to give the patients these instructions. Furthermore, it is still difficult to find specialized nurses in the surgical outpatient clinics. For these reasons, we have designed a pilot case-control study, where we try to investigate: (I) the role of specialized nurses in thoracic surgery and enhanced recovery protocols in preoperative instructions' compliance, as primary outcome and (II) the general compliance of preoperative instructions in a real-world scenario as secondary outcome. We present this article in accordance with the STROBE reporting checklist (available at https://shc.amegroups.com/article/view/10.21037/shc-23-27/rc).

Methods

We designed a retrospective pilot case-control study and we have included all the patients submitted to elective thoracic interventions under general anesthesia in Clínica Universidad de Navarra between August 2018 and December 2020.

Patients whose preoperative evaluation was performed by a non-thoracic surgery-specialized, non-ERAS® trained nurse, were considered controls. Patients whose preoperative evaluation and education were responsibility of a thoracic surgery-specialized and ERAS® trained nurse were considered cases. As the study was part of a department quality audit, consent was not needed.

Non-ERAS®, non-thoracic surgery-trained nurses were defined as nurses working in the clinic setting, covering all the specialties using the clinic at that moment (including cardiology, allergology and neurology) without specific training in thoracic surgery nor in perioperative consultation. These nurses were instructed to give preoperative information to patients, including spirometer use, but they were not further involved in patients' perioperative journey.

Thoracic surgery-specialized and ERAS® trained nurses were nurses specifically hired for the department, who, apart from a deep knowledge of thoracic surgery preoperative processes, were involved in the whole patient care process (preoperative evaluation, preoperative education and postoperative follow up and evaluation), although for the study purpose, only the preoperative phase of care was taken into account.

Nurse consultation was routinely planned after surgeon's preoperative clinic visit. Prior to 14th April 2019, when the first dedicated thoracic surgery nurse was hired, all patients were evaluated by a non-thoracic surgery-specialized, non-ERAS® trained nurse. After that date the type of nurse responsible for the preoperative consultation depended on nurse's and surgeon's schedule.

Although our institutional ERAS® protocol includes all the recommendations in the guidelines (1), as preoperative anemia correction, nutritional assessment, smoking cessation, etc., for study purposes we have only selected those items related to preoperative nursing consultation and those were the evaluation of the specialized nursing intervention was mandatory.

For these reasons, the variables of interest considered for the study had been as follows:

(I) Preoperative fasting: 6 hours prior to the surgical intervention for solids and liquids and 2 hours prior to the intervention for clear liquids.

(II) Chest physiotherapy training: during preoperative nursing consultation, all the patients receive an incentive spirometer and they are actively instructed in its use. Furthermore, they are given written chest physiotherapy instructions, with graphics and drawings showing the different exercises. These indications are reviewed with the patients and the nurses solve any doubt or any

Highlight box

Key findings

- Preoperative evaluation by specialized nurses improves compliance of preoperative instructions, specially those related to nurses' intervention.

What is known and what is new?

- Preoperative recommendations have been well defined in some specialties, as Anesthesiology but it remains unclear who is the most appropriate professional to give the patients these instructions.
- There is a lack of published studies analyzing the role of specialized nurses in perioperative outcomes.

What is the implication, and what should change now?

- Our results highlight the importance of specialized nurses in outpatient clinics to improve compliance of perioperative instructions.

Table 1 Compliance with preoperative items based on the type of nurses who performed the preoperative assessment

Preoperative items	Dedicated nurses, n (%)	Non-dedicated nurses, n (%)	Total, n (%)	P value
Preoperative fasting (2 hours)	80 (94%)	32 (86%)	112 (92%)	0.15
Chest physiotherapy training	82 (96%)	32 (86%)	114 (93%)	0.05
Gabapentin administration	83 (98%)	28 (76%)	111 (91%)	0.0003
LMWH administration	78 (92%)	28 (76%)	106 (87%)	0.02
Preoperative antimicrobial shower	75 (88%)	25 (68%)	100 (82%)	0.006

LMWH, low molecular weight heparin.

Table 2 Compliance with preoperative fasting based on the type of nurses who performed the preoperative assessment

Fasting	Dedicated nurses	Non-dedicated nurses	Total, n (%)
No	5	5	10 (8%)
Yes	80	32	112 (92%)
Total	85	37	122 (100%)

Odds ratio: 2.5, 95% confidence interval: 0.53–11.57, χ^2 P=0.15.

difficulties patients present.

(III) Chronic pain prevention: 300 mg of gabapentin administration 12 and 2 hours prior to the operation.

(IV) Deep venous thrombosis prophylaxis: prophylactic low molecular weight heparin (LMWH) administration 12 hours prior to the operation (in our institution, we administer 3,500 UI of bemiparin). As in our practice patients are not admitted the day prior to surgery, they are instructed by nurses to administer LMWH at home.

(V) Preoperative shower with chlorhexidine gluconate gel the day of the operation.

To avoid unnecessary prescription and medication storage, we give the patients all the medication doses needed to follow preoperative instructions. These instructions are always accompanied by written information regarding administration indications and possible side effects.

Compliance with the different preoperative instructions was evaluated on patients' admission, the same day of the operation. All the data was included in real time in patients' electronic medical record and in a department prospective database.

The statistical analysis was performed with STATA/IC 15 (Stata Corp, Texas, USA) using case control studies' methodology, and 2×2 tables with measures of association. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by our Institutional IRB (Number 2022.020) and individual consent for this retrospective analysis was waived.

Results

Between August 2018 and December 2020, 122 patients were submitted to thoracic interventions under general anesthesia in our institution. Of them, 37 (30%) were preoperatively assessed by non-dedicated nurses (controls) and 85 (70%) by thoracic surgery specifically trained nurses (cases). All patients were prospectively included in the study.

Compliance with different items is shown in *Table 1*. Five patients (14%) in the control group and 5 patients (6%) among the cases did not fast preoperatively (OR: 2.5, 95% CI: 0.53–11.57, χ^2 P=0.15, *Table 2*). Five patients (14%) in the control group were not adequately trained in chest physiotherapy while they were only 3 (4%) in the cases group (OR: 4.27, 95% CI: 0.77–28.70, Fisher's exact test P=0.05, *Table 3*). Nine patients (24%) among controls did not take preoperative gabapentin, opposite to 2 (2%) in the cases group (OR: 13.33, 95% CI: 2.48–130.81, Fisher's exact test P=0.0003, *Table 4*). LMWH was not administered in 9 patients (24%) in the control group and in 7 (8%) in the cases group (OR: 3.58, 95% CI: 1.06–12.35, P=0.02, *Table 5*). Twelve patients (32%) in the controls group did

Table 3 Compliance with preoperative chest physiotherapy instructions based on the type of nurses who performed the preoperative assessment

Chest physiotherapy	Dedicated nurses	Non-dedicated nurses	Total, n (%)
No	3	5	8 (7%)
Yes	82	32	114 (93%)
Total	85	37	122 (100%)

Odds ratio: 4.27, 95% confidence interval: 0.77–28.70, Fisher's exact test P=0.05.

Table 4 Compliance with preoperative gabapentin administration based on the type of nurses who performed the preoperative assessment

Gabapentin	Dedicated nurses	Non-dedicated nurses	Total, n (%)
No	2	9	11 (9%)
Yes	83	28	111 (91%)
Total	85	37	122 (100%)

Odds ratio: 13.33, 95% confidence interval: 2.48–130.81, Fisher's exact test P=0.0003.

Table 5 Compliance with LMWH administration based on the type of nurses who performed the preoperative assessment

LMWH	Dedicated nurses	Non-dedicated nurses	Total, n (%)
No	7	9	16 (13%)
Yes	78	28	106 (87%)
Total	85	37	122 (100%)

Odds ratio: 3.58, 95% confidence interval: 1.06–12.35, χ^2 P=0.02. LMWH, low molecular weight heparin.

Table 6 Compliance with preoperative chlorhexidine gluconate gel shower based on the type of nurses who performed the preoperative assessment

Chlorhexidine gluconate gel shower	Dedicated nurses	Non-dedicated nurses	Total, n (%)
No	10	12	22 (18%)
Yes	75	25	100 (82%)
Total	85	37	122 (100%)

Odds ratio: 3.6, 95% confidence interval: 1.24–10.44, χ^2 P=0.006.

not shower with the specific antimicrobial gel, opposite to 10 (12%) in the cases group (OR: 3.6, 95% CI: 1.24–10.44, P=0.006, *Table 6*).

Discussion

ERAS® guidelines have been elaborated and implemented in almost every surgical specialty (1,4,5). However, despite the importance given to preoperative information and evaluation in them (1), none of the guidelines indicates how this evaluation should be performed and how the information should be transferred to the patients.

Although some authors have shown the relationship between quality of preoperative information and postoperative pain scale (6), the extent, type and format of this information is controversial. Some studies support psychological techniques (7) to control postoperative anxiety and fear and to favor enhanced recovery after general anesthesia (8), while others highlight the importance of written information brochures, patient-written notes (9) or audiovisual media (10). Finally, the question of who should administer this information remains unanswered (11). There are multiple institutions that have implemented nurse-led patient education programs in thoracic surgery (12,13),

but there is limited data regarding the compliance with preoperative instructions, regardless they are administered by physicians or nurses (14,15).

In our study, despite the limited number of comparable works published, we have found a preoperative fasting non-compliance value of 8% (10 out of 122 patients), considerably higher than those found in other series (15,16). Although 14% of the patients in the controls group did not fast as indicated, the 6% non-compliance value in the cases group remains higher when compared with the 1.5–4% non-compliance rates published in different studies (15-17). It is far beyond the objectives of this study, but we hypothesize this high non-compliance rates were related, on the one hand, with the implementation of same-day admission (traditionally, in our institution, patients were admitted 24 hours prior to the surgery) and, on the other hand, with problems related to the intake of clear liquids until 2 hours prior to the operation.

Preoperative chest physiotherapy has shown a positive impact not only in shortening length of stay but also in decreasing postoperative complications of patients submitted to thoracic interventions (18). However, there are limited studies analyzing its compliance (19). The compliance with chest physiotherapy instructions in our whole series was 93%, similar to previously published results including not only thoracic surgery but also other specialties, as colorectal and prostate surgery, where compliance rates observed ranged from 81% to 93% (19,20).

Gabapentin use in thoracic surgery continues to be controversial, with limited data and difficult to interpretate results, both in preoperative and postoperative settings (21-23). Conversely, perioperative heparin use is widely implemented to prevent deep venous thrombosis (24,25). Although is not clear when to start it, depending on guidelines and admission timing it has shown to be safe when its administration starts 24 hours preoperatively and continues postoperatively (25). Most of the studies analyzing compliance with heparin administration come from orthopedic interventions (26), and the non-compliance values in these series range from 48% to 97% (26,27). Although our non-compliance value is 13%, lower than those reported by other authors, our analysis does not include postoperative administration and this lack of follow up could have had influenced the results obtained.

Preoperative shower with chlorhexidine gluconate gel has demonstrated an infection-rate decrease of 4% (28), however, it is the preoperative item where we have observed less compliance (82%). This could be explained by the lack of knowledge of its importance in infection prevention. These results are similar to others already reported in the literature, along different surgical specialties (29,30), and the reasons for non-compliance are similar to those observed in our study.

Results of our study should be interpreted in light of both its strengths and limitations. Although our analysis demonstrates the importance of specialized nursing in compliance with preoperative instructions in thoracic surgery, it includes a small number of patients and only preoperative data. The lack of postoperative data analysis makes it impossible to stablish a relationship between preoperative instructions' compliance and other quality of care indicators as postoperative complications and length of stay. Furthermore, some confounding factors as patients' socio-economic characteristics and educational background have not been taken into account for this study, with the implications they could have in preoperative instructions compliance.

Further analysis of larger series is needed not only to facilitate a better understanding of preoperative instructions compliance and the reasons preventing it, but also to analyze quality of care perceived by the patients during these evaluations, to stablish continuous improvement actions and to promote the design of standardized information contents that help the understanding of preoperative information.

Conclusions

In our patient's population preoperative evaluation and education by fully dedicated, specifically trained thoracic surgery nurses increases compliance with preoperative ERAS® guidelines instructions, especially of those related with nurses' intervention.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://shc.amegroups.com/article/view/10.21037/shc-23-27/rc

Data Sharing Statement: Available at https://shc.amegroups.com/article/view/10.21037/shc-23-27/dss

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://shc.amegroups.com/article/view/10.21037/shc-23-27/coif). M.R. reports personal fees from Ethicon, Abex/Intuitive and AstraZeneca outside the submitted work. The other authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by our Institutional IRB (Number 2022.020) and individual consent for this retrospective analysis was waived.

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