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The importance of a preoperative surgical strategy meeting for good patient outcomes

Ameliyat öncesi cerrahi strateji toplantısı uygulamasının postoperatif sonuçlar üzerine etkisi

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Abstract

Purpose: Interest in measures to surgical quality improvement is increasing with increased awareness of iatrogenic injuries. These injuries can be prevented by an improved organisational safety habit. We implemented preoperative surgical strategy meeting chart in the clinical and operational basis in our hospital to improve postoperative outcomes.

This study was conducted as comparement of outcomes of patients with and without implementation of preoperative surgical strategy meeting forms.

Material and methods: Data including the demographic characteristics of patients, procedural data, and data of preoperative surgical strategy meeting were recorded retrospectively. Patients were divided into two groups according to the preoperative surgical strategy meeting chart application status. Group 1 included the patients with provided PSSM and group 2 included the remaining patients. Data related with surgical procedure and patients' outcomes were compared between these groups.

Results: One hundred and forty patients were enrolled in this study. The mean age of the patients was 45.28±17 years. The female to male ratio was 62:78. Patients were grouped according to the application status of PSSM. There was no statistically significant difference in the mean age, sex, operation type (emergent or elective) and conversion to open surgery rates. In Group 2 being ready of patient file in the operating theatre preoperatively was statistically significantly low when compared to Group 1 (p=0.021). Operation time was detected statistically significant short for patients in Group 1 (p<0.001).

Conclusion: Integrating this behavioural intervention into the clinical routine demonstrated the improvements in patient outcomes and adherence to the safety process.

Key words: Checklist, Iatrogenic injury, quality improvement, safe surgery, surgical meeting.

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Öz

Amaç: İyatrojenik yaralanmalar konusunda farkındalık arttıkça, cerrahi kalite gelişimi konusunda ilgi artmaktadır. Bu yaralanmalar artan organizasyonel güvenlik kültürü ile önlenebilmektedir. Hastanemizde, ameliyat sonrası sonuçlanımları geliştirmek için klinik ve ameliyathanede cerrahi strateji toplantısı şablonu oluşturulmuştur.

Bu çalışmada ameliyat öncesi cerrahi strateji toplantısı şablonu uygulanan ve uygulanmayan hastaları karşılaştırmak için düzenlenmiştir.

Gereç ve yöntem: Hastaların demografik verileri, ameliyat verileri ve ameliyat öncesi cerrahi strateji toplantısı verileri retrospektif olarak toplandı. Hastalar ameliyat öncesi cerrahi strateji toplantısı şablonu (PSSM) uygulama durumuna göre iki gruba ayrıldı. Grup 1'deki PSSM'si olan hastaları, grup 2 diğer hastaları içermektedir. İki gruptaki cerrahi prosedürle ilgili veriler ve hastaların sonuçları karşılaştırılmıştır.

Bulgular: Çalışmaya 140 hasta dahil edilmiştir. Hastaların ortalama yaşı 45,28±17 idi. Çalışmaya katılan hastaların kadın erkek oranı 62:78 idi. Hastalar PSSM'nin uygulanma statüsüne göre gruplandılar. Ortanca yaş (p=0,966), cinsiyet (p=1), ameliyat tipi (acil veya elektif p=0,323) ve açık cerrahiye geçme oranları (p=0,295) arasında istatistiksel olarak farklılık saptanmadı. Grup 2'de hastaların dosyalarının ameliyathanede ameliyat öncesi hazır bulunma oranı Grup 1'e oranlar istatistiksel olarka anlamlı derecede düşüktü (p=0,021). Grup 1'deki hastaların ameliyat süreleri istatistiksel olarak anlamlı derecede kısaydı (p<0,001).

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Sonuç: Bu davranışsal girişimin klinikte rutin olarak uygulanması hasta sonuçlarında iyileşme, güvenlik prosedürlerin uyumu arttırmaktadır.

Anahtar kelimeler: Kontrol listesi, iyatrojenik yaralanma, kalite iyileştirme, güvenli cerrahi, strateji toplantısı.

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Introduction

Preventing complications and ensuring patient safety are the main priorities of health care systems. Patient safety has become an increasingly important issue throughout the world. The increase in costs associated with the development of medical practices has caused hospital managers to institute cost-reducing measures and this situation can be a main source of security problems [1, 2]. In industrialized countries, almost half of the complications in hospitalized patients are related to surgical care, and at least half of the postoperative complications are considered preventable according to World Health Organization (WHO) data [3]. A significant portion of medical practioner-induced complications can be prevented by improved organizational safety habits and preoperative surgical checklists [4]. Therefore, interest in surgical quality improvement trials has increased considerably in recent years with the increased awareness of iatrogenic injuries [5, 6].

The importance of implementing preoperative surgical strategy meetings (PSSM) has become more important during the last decades. Many studies have shown that a team approach and communication among team members could prevent major complications [7-9]. In clinical practice, the rationale of PSSM is based on the detection and prevention of potential human errors before they can cause harm to the patients [10]. Some of these potential errors are wrong sided surgery, intraoperative or postoperative complications, medication errors, and pressure ulcerations [11]. A PSSM ensures the procedures to be performed are carried out in a planned way, eliminating dependence on human memory and preventing complications by strengthening communication among teammates [6].

Developing an accurate indication for optimal treatment plan has key importance, in terms of decreasing perioperative complications. In June 2008, the WHO developed a surgical safety checklist to be used widely to ensure perioperative patient safety [12]. Use of the WHO surgical safety checklist and others has been linked to improvements in patient outcomes, compliance with standard processes of care, and good quality teamwork in the operating room; however, these checklists lack queries for indications and treatment plans [5, 13-18]. A PSSM is a form that includes queries about indications and treatment plans. It has been implemented in our hospital and is included in patient files.

We implemented PSSM forms for clinical and operational activities in our hospital. This study aimed to determine the effect of the implementation of these PSSM forms on clinical practice in terms of avoiding unnecessary or incomplete surgical procedures, predicting preoperative and intraoperative difficulties, and reducing complications. We compared the results for patients who were treated with and without the application of PSSM forms.

Materials and methods

This retrospective cohort study included patients over 18 years who underwent an elective/emergency surgical procedure (appendectomy, cholecystectomy, inguinal hernia repair, or gastrectomy) in the Department of General Surgery, University of Health Science Sisli Hamidiye Etfal Education and Research Center between January 1, 2017 and December 30, 2017. We obtained data on each operation with standardized data sheets completed by the clinical teams who were involved in surgical care and surgical safety. Perioperative data included the demographic characteristics of patients, procedural data, and data from the PSSM chart. The PSSM chart included patient characteristics, history, physical examination results, laboratory and radiological findings, diagnosis, treatment plan, and predictable complications, as shown in Table 1. The study was conducted in accordance with the provisions of the Helsinki

Table 1. 'Preoperative Surgical Strategy Meeting' chart

Name-Surname:	Date of birth:
Story:	
Patient history:	Family history:
Laboratory findings:	Radiological finding:
Diagnosis:	Treatment plan/ Operative strategy:
Predictable complications:	

Declaration. Informed consent was obtained from all the patients included in the study. Ethics approval for the study was obtained from the University of Health Science, Kartal Kosuyolu Higher Specialized Educational and Research Hospital Institutional Ethics Committee and was assigned the number 2020/6/345.

Surgical procedures performed by senior surgeons with similar competence between the specified dates were included in the study. Prophylactic antibiotics were administered according to the guidelines of the local infection control committee. Before the elective surgical procedures, the patient information, and hospital records were checked in accordance with the PSSM chart on the morning of surgery, and the surgical procedure was carried out with the consensus of at least two senior surgeons. For emergency surgical procedures, the consultant surgeon's opinion was recorded in an on-call meeting and the agreed surgical intervention was performed.

Patients were divided into two groups according to the obtained data. Group 1 included the patients who were treated by applying the PSSM chart. Some surgeons from the same team did not apply the PSSM chart in their clinical routine and these patients constituted Group 2. The effects of a PSSM on operative data and patients' outcomes were compared between the two groups.

Statistical analyses

The results were analyzed using SPSS version 21.0 (Statistical Package for the Social Sciences Inc, IBM, Armonk, NY, USA). Numerical variables were expressed as the mean ± standard deviation, median (range) or minimum and maximum based on the distribution pattern. Categorical variables were presented as absolute values and percentages. A Mann Whitney U test was used for randomly distributed numerical variables. Differences between continuous and categorical variables were assessed with a Chi-squared test. *P* values less than 0.05 were considered statistically significant.

Results

One hundred and forty patients with a mean age of 45.28±17 years were included in the study. Sixty-two patients were female and 78 were male. The mean age of patients in Group 1 was 45.5±18.3 years and the mean age of Group 2 was 45.0±16.0 years. There were no statistically significant differences in the mean age, sex, operation type (emergent or elective), and conversion rates (p=0.966, p=1.000, p=0.323, and p=0.295, respectively; Table 2). Having the patient file in the operating theater preoperatively was statistically significantly lower in Group 2 than in Group 1 (p=0.021; Table 2). Operation times were statistically significantly shorter for patients in Group 1 (p<0.001; Table 3).

The complication rates between groups were not statistically different when considering the disease/operation type (p=0.358). The only complication was surgical site infection (SSI). SSI was detected in four of the patients in Group 1. Two of the patients had an appendectomy while the remaining had a history of total gastrectomy. In Group 2, SSI was detected in three patients and one of these patients had an appendectomy while the remaining patients had a total gastrectomy. No other minor or major complications were recorded for the remaining 133 patients.

When necessary, the need for unplanned peroperative consultations (peroperative upper GI endoscopy for the identification of tumor location), although not statistically significant, were lower in the PSSM group (2 out of 17 vs 3 out of 10 p=0.239).

Table 2. Effect of implementation of PSSM chart on surgical outcome

		PSSM				
		Yes (Group 1)		No (Group 2)		
		Mean±SD (Min-Max)		Mean±SD (Min-Max)		*p*
Age (year)		45.5±18.3 (19-87)		45.0±16.0 (18-81)		0.966
Operation time (minutes)		77.5±61.3 (25-220)		84.8±59.1 (29-235)		<0.001
		n	%	n	%	*p*
Sex	Female	35	44.3	27	44.3	1.000
	Male	44	55.7	34	55.7	
Opearation type	Emergent	40	50.6	36	59.0	0.323
	Elective	39	49.4	25	41.0	
Surgical procedure	Appendectomy	9	11.4	4	6.6	0.314
	Inguinal hernia	5	6.3	6	9.8	
	Cholecystectomy	4	5.1	0	0	
	Laparoscopic Appendectomy	22	27.8	15	24.6	
	Laparoscopic Inguinal Hernia Repair	4	5.1	5	8.2	
	Laparoscopic Cholecystectomy	18	22.8	21	34.4	
	Total Gastrectomy	17	21.5	10	16.4	
Appropriate patient position		57	72.2	42	68.9	0.671
Preoperative preperation		61	77.2	36	59.0	0.021
Antibiotic prophylaxis (<60 min)		59	74.7	37	60.7	0.076
Complication		4	5.06	3	4.9	0.358
Conversion of operation type		3	3.8	5	8.2	0.295
Equipment preperation		54	68.4	36	59.0	0.253

*PSSM: Preoperative surgical strategy meeting

Table 3. Operation time schedule classified according to the type of surgery

				Operation Time (minutes)		
		PSSM	n	Mean±SD	Median	*p*
Surgical procedure	Appendectomy	No	4	43.5±9.9	47.5	0.239
		Yes	9	42.1±2.6	41	
	Inguinal hernia	No	6	65.0±6.0	65	0.013
		Yes	5	50.8±7.0	50	
	Cholecystectomy	Yes	4	69.0±9.8	67.5	-
	Laparoscopic Appendectomy	No	15	55.3±8.3	56	<0.001
		Yes	22	43.9±8.0	44	
	Laparoscopic Inguinal Hernia Repair	No	5	71.2±6.3	70	0.014
		Yes	4	49.8±4.6	49	
	Laparoscopic Cholecystectomy	No	21	60.8±9.1	62	<0.001
		Yes	18	44.1±10.4	42.5	
	Total Gastrectomy	No	10	215.0±13.9	217.5	<0.001
		Yes	17	191.5±17.3	190	

*PSSM: Preoperative surgical strategy meeting

Data on the timing of antibiotic prophylaxis (AP) was also available and the rate of AP application on time (within 60 minutes before induction of anesthesia) was 74.7% and 60.7% for Group 1 and Group 2, respectively. There was no statistically significant difference for AP application times between the groups (p=0.076).

Discussion

Team-based applications, such as a PSSM, are innovations that improve surgical quality. They have been shown to be effective in reducing surgical complications and mortality worldwide [5, 19-21]. Surci et al. [22] reported that a PSSM was beneficial in dealing with intraoperative difficulties, especially for high-volume centers. Although the use of PSSM reduced operation times compared to the control group, there was no difference in terms of complication rates. The most important reason for this is awareness of the problems that may be encountered during surgery in the patient group who were treated with use of a PSSM. The use of a PSSM chart alone indicates that patients may have various deficiencies in preparation for surgery. This shows that the improvements observed during the operation process and results are dependent on many factors, including the effective application of a PSSM chart and its application methods [23]. In fact, the absence of a focused implementation program to support chart entries (including parameters such as training, feedback, local compliance, and participation from all levels of the organization) may cause the effects of the charts on results to be overlooked [24, 25].

The Preoperative Surgical Strategy Meeting procedure can be performed similarly for emergency or elective surgery. Our study results showed that there was no significant difference between the two groups in terms of the feasibility of the PSSM procedure for emergency and elective operations. In 2011, Kearns et al. [26] reported a survey study that was conducted three months after the implementation of the WHO checklist, and 30% of the responders thought the checklist could not be applied in emergency operations. In the surveys before the checklist published by the WHO, 53% of the responders reported that it could not be hypothetically applied to emergency operations. This ratio shows that the opinion was shifted to the positive side after the list was first published. A study in Switzerland [27] was conducted in a large anesthesiology ward and it focused on verifying two key pieces of information: patient identification and surgical site. Barriers to implementation included: 1) surgeons saying that they already knew the patient or the surgical site was open, and 2) not including the input of

all surgical services in the development of the protocol. Some teammates from surgical teams have also suggested that the current checklists could be time consuming, but WHO noted that the checklist takes no more than three minutes to complete. In short, a PSSM chart can be easily applied with any type of surgery and is essential for patient safety.

One of the most common defects is patients who had preoperative preparations weeks before surgery and they came to the operating theater without checking the preoperative preparation that would happen on the day of surgery. Before a patient enters the operation theater, a PSSM chart is used to whether check preoperative tests were completed and up-to-date, reaffirm the operation strategy, and check the surgical equipment. These are important procedures that assure the appropriate operation can be performed in the scheduled time. In our study, the number of patients who entered the operation theater with complete preoperative preparation was higher in Group 1 compared to Group 2 (p=0.021). Operation times were also significantly lower in the PSSM applied group (Group 1) when we classified them according to type of surgery.

Surgical site infection is a common complication of surgeries. Although many factors have been identified that reduce the SSI rate, the effect of preoperative AP application is one the most important [28, 29]. In this study, we showed that application of the preoperative surgical checklist increases compliance with the hospital standards of AP timing. The rate of patients not taking antibiotics before surgery has also decreased significantly. In our center, AP is given in the operating room and the timing of AP is 60 minutes before a standard incision. Often, the anesthesiologist places an intravenous line when the patient reaches the operating room. Prior to implementation of the preoperative surgical checklist, antibiotics were given by the anesthesiologist at the start of the induction in some cases, which increased susceptibility to SSIs.

The Preoperative Surgical Strategy Meeting procedure is especially important to prevent errors in bilateral operations, long-lasting surgical procedures, and operations with changes in the surgical strategy or method perioperatively. Surgical checklists are essentially a “behavioral” intervention, meaning that their effective implementation requires the operating room staff to make consistent changes in their behavior. Therefore, as discussed repeatedly in the literature, the fact that these behavioral modeling lists provide a reliable quality control system depends not only on their adoption by employees, but also on the attitude change of the operating room team and their commitment to procedures and the development of surgical safety customs in the operating room [25, 30].

The most important limitation of our study was it being carried out at a single center and not having another hospital for comparison. Although, performing PSSM may improve the immediate preoperative anesthesia evaluation, data regarding this parameter was not presented due to the design of the current study. The effect of PSSM on blood transfusion in the perioperative may also be estimated. Studies with larger cohorts including mainly oncological patients would be more beneficial in order to evaluate these parameters. Although the observations were from a single institution with a limited number of patients, we believe that integrating this behavioral intervention into the clinical routine demonstrates the feasibility of integrating this behavioral checklist with continuous improvements in patient outcomes and adherence to the safety process. In addition, the fact that the employees are on the same team ensures that they work as a controlled group.

In conclusion, although there was no clear conclusion about a preoperative checklist minimizing surgical errors, there were some meaningful results from the study. These include ensuring all critical tasks are carried out, promoting a non-hierarchical, broad-based team approach, improving in-team and inter-team communication, detecting possible human errors early, and predicting some complications that could result from human errors.

Conflict of interest: No conflict of interest was declared by the authors.

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Availability of data and material: All data generated or analysed during this study are included in this published article.

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Contributions of the authors to the article

E.B. Substantial contributions to conception and design, analysis and interpretation of data, and drafting the article. S.Ö. Substantial contributions to conception and design, data collection and analysing. M.T. Substantial contributions to conception and design and acquisition of data. E.Ö. Substantial contributions to conception and design, data collection and drafting the article. İ.H.Ö. Substantial contributions to conception and design, acquisition of data, and drafting the article. C.K. Substantial contributions to conception and design, acquisition of data, and drafting the article. All authors critically revised the manuscript and gave final approval of this version to be published.