

Occasional Reviews

Late operating room starts: experience with an education trial

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Purpose: This study was undertaken to determine if late starts of first cases in the Operating theatres at the SMBD-Jewish General Hospital remained a problem after identification of the causes of late starts and remedial actions being taken.

Methods: Hospital approval was obtained. A retrospective chart audit analyzed a two week period (10 days with 90 elective surgical cases) in October 1993. The time of entry by the first patient into each Operating Room (OR) was transcribed from the nursing records from each OR. A late start was defined as patient entry into the OR after 0745 hr. This audit revealed 77.8% of patients scheduled for surgery at 0745 entered the OR late with a cumulative time lost of 1101 min. The reasons for this inefficiency were identified by a follow-up assessment in April 1995 as a result of this audit. Corrective measures included presentation of inpatients for the first case, reorganization of transport personnel schedules to facilitate arrival of patients to the OR, alteration of patient verification procedures prior to entry to the OR, and education of nursing, anaesthesia, and surgical personnel of the scope of the problem of late OR starts. All attending surgeons were notified either by letter or by discussion at departmental rounds. These measures were in effect by July 1995. A second audit, using the same methodology as the first, evaluated a two week period (10 days with 87 elective surgical cases) in October 1995.

Results: The second audit showed 65.5% of patients (average of 9 operating rooms daily) scheduled for surgery at 0745

entered the OR late with 601 min lost. The average delay for late starting cases decreased from 15.73 ± 4.56 to 10.54 ± 3.92 min ($P < 0.05$).

Conclusion: Late OR starts are common and only modest improvements can be achieved without cooperation from anaesthetists and surgeons to arrive on time.

Objectif: Cette étude visait à déterminer si, à l'Hôpital Général Juif de Montréal, les retards apportés à débiter des premières interventions en salles d'opération continuaient de causer des difficultés une fois les causes de ces retards identifiées et les mesures correctrices appliquées.

Méthodes: L'hôpital avait signifié son accord. L'audit rétrospectif des dossiers portait sur une période de deux semaines (dix jours comportant 90 interventions programmées) d'octobre 1993. Le moment de l'admission du premier patient dans chaque salle d'opération (SO) était transcrit à partir du registre des soins infirmiers. Le retard était défini comme l'admission en salle du patient après 07h45. Cet audit a révélé que 77.8% des patients programmés pour la chirurgie à 07h45 entraient en SO après une perte cumulative de temps de 1101 min. Les raisons de cette inefficacité étaient réévaluées en avril 1995 par un contrôle établi sur la base de cet audit. Les mesures correctrices concernaient l'arrivée des patients pour la première intervention, la réorganisation du service de brancardiers pour faciliter l'admission des patients, la modification des méthodes de vérification avant l'admission en SO et l'éducation du personnel infirmier, anesthésique et chirurgical sur l'étendue des problèmes causés par les retards. Tout le personnel intéressé était avisé soit par lettre soit verbalement au cours de réunions départementales. Ces mesures entraient en vigueur en juillet 1995. Un deuxième audit, dont la méthodologie était la même, évaluait deux semaines (10 jours comportant 87 interventions programmées) d'octobre 1995.

Résultats: Le deuxième audit a montré que 66,5% des patients (en moyenne neuf salles d'opération par jour) programmés pour une intervention à 7h45 entraient en SO avec un retard de 601 min. Le délai moyen pour les interventions ultérieures diminuait de $15,73 \pm 4,56$ à $10,54 \pm 3,92$ ($P < 0,05$).

Conclusion: En SO, les débuts différés sont fréquents et on ne peut s'attendre qu'à de modestes améliorations si les anesthé-

Key words

ANAESTHESIA: cost;

ECONOMICS: cost.

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Accepted for publication August 17, 1996.

sistes et les chirurgiens ne collaborent pas par leur ponctualité.

Our health care system is currently undergoing a period of downsizing.¹ While there is an economic imperative to cost reduction,²⁻⁶ it would be ideal to accomplish this goal in a fashion which did not infringe on quality, or reduce access of patients to health care. One approach to achieve this goal would be to decrease inefficiencies in the existing system.

At the SMBD-Jewish General Hospital delayed start of first cases in the Operating Room (OR) was identified as one area of possible inefficiency. We set out to determine if this was true, to identify causes of the late starts, and to determine if organizational modification of the contributing factors, plus education of medical and paramedical staff could reduce the problem.

Methods

The SMBD-Jewish General Hospital is a University teaching hospital whose OR serves approximately 6500 inpatients and 9500 out-patients per year using 17 Operating theatres. A full range of general hospital surgical services is provided with the exception of paediatric surgery. At the time of inception of this study out-patients were expected to register at the hospital approximately one and a half hours before surgery, after which they were transferred to a holding area in the OR. In-patients were transported on stretchers by orderlies directly to the holding area. In the holding area patients were checked by a nurse prior to transport to the designated operating theatre. Patients were brought into the theatre by the anaesthetist after verification that the surgeon was in the building.

With hospital approval, we performed a retrospective audit of a two week elective surgical period spanning the last week of October and the first week of November in 1993. This period was chosen because it excluded all holidays and major conferences. Consequently, representation of all surgical specialties along with consistent patient volume were assured. The nursing records were reviewed for each OR where Anaesthesia personnel were scheduled. The start time, defined by patient entry into the OR, is 0745 hr. The time recorded by the circulating OR nurse as "time patient in" was considered as the time of patient entry to the OR. The difference between time of patient entry to the OR and scheduled OR start time was subtracted. Since no one was aware that this audit was to be undertaken, we assume that all times recorded by the circulating nurses are accurate.

A follow-up prospective quality control study was

performed over three weeks from March 28, 1995 to April 14, 1995. Times were recorded by nurses and anaesthesia technicians from patient arrival to the holding area through the time the patient entered the OR until the surgeon arrived in the Operating theatre. Space was left for explanatory comments, should the time be after 0745 hr, as to why the patient entered the OR late. This analysis revealed that there were multiple causes for the late starts including late patient arrival to the holding area, late preparation of the Operating theatre or setup, and late arrival of the anaesthetist or surgeon. This follow-up assessment resulted in the following corrective measures. Whenever possible, out-patients would no longer be scheduled as the first case of the day. The work schedule of the transport personnel was reorganized to facilitate arrival of first case patients to the OR. As well, patients could be brought into the OR by the anaesthetist before the OR setup was complete. These corrective measures were in effect within three months of the March 1995 audit. The problem of late arrivals by attending anaesthetists and surgeons was addressed over several meetings at the level of the Surgical Committee where all Surgical Divisions and Departments are represented. As well, a subcommittee was created and this group drafted a letter to the Chief of Surgery seeking his assistance in correcting the problem of late starts. He was specifically requested to send a letter to all attending surgeons reminding them that the "time saved at the beginning of the day could make the difference of the last case being done or not at the end of the day."

The anaesthesia group was reminded individually by letter and by report at a Departmental meeting of the importance of punctuality. Most attending anaesthetists were physically present for the discussion at the Departmental meeting. Actual dollar figures were not calculated but a general statement regarding cost savings in reduced overtime salaries for nurses was emphasized. The Head nurse in the OR was present at the Surgical committee meetings and was a member of the subcommittee searching for ways to improve OR efficiency. No residents were ever specifically informed of the policy changes. A follow-up retrospective audit, with hospital approval, was performed two years after the first, and three months after implementation of the educational and organizational changes, to assess the efficacy of these measures. Anaesthetists (except one fellow who was not present during the first audit), surgeons, and OR nurses were consistent between the two audits. All of the surgeons or anaesthetists (except the fellow) involved in these cases were paid on a fee-for-service basis.

Data were analyzed using an unpaired two tailed t test

TABLE I 1993 Audit of elective start time

	Late starts #	Scheduled cases #	Delay min
<i>Week 1</i>			
Mon	5	9	55
Tues	8	9	115
Wed	7	9	65
Thurs	8	8	120
Fri	<u>3</u>	<u>8</u>	<u>35</u>
Total	31	43	390
<i>Week 2</i>			
Mon	10	10	235
Tues	8	10	138
Wed	8	9	153
Thurs	6	9	60
Fri	<u>7</u>	<u>9</u>	<u>125</u>
Total	<u>39</u>	<u>47</u>	<u>711</u>
Grand total	70	90	1101

TABLE II 1995 Audit of elective start times

	Late starts #	Scheduled cases #	Delay min
<i>Week 1</i>			
Mon	5	9	65
Tues	6	10	70
Wed	6	9	32
Thurs	6	9	53
Fri	<u>6</u>	<u>8</u>	<u>45</u>
Total	29	43	265
<i>Week 2</i>			
Mon	6	8	49
Tues	6	10	50
Wed	4	7	65
Thurs	6	8	105
Fri	<u>6</u>	<u>9</u>	<u>67</u>
Total	<u>28</u>	<u>42</u>	<u>336</u>
Grand Total	57	87	601

TABLE III Causes of late OR starts

	March 28 – April 15, 1995		February 12 – 23, 1996	
	Patients #	Late starts %	Patients #	Late starts %
Patient related	20	24	10	33
Anaesthetist late	26	31	8	27
Surgeon late	18	22	11	37
Nurse related	7	8	0	0
No reason given	12	14	1	3

assuming unequal variances with the commercial statistics program Instat.

Results

In 1993 (Table I) 1101 minutes of elective surgical operating time were lost during the two weeks involving

90 cases. Patients entered the OR theatre after the 0745 start time in 77.8% of cases studied. The average time lost was 15.73 ± 4.56 min for those cases (n = 70) which started late. After implementation of the described changes and education program, the second audit (Table II) revealed a loss of 601 min over 87 cases in the two week period. Sixty-five and one-half per cent (65.5%) of patients entered the OR theatre late. The average time lost per case (n = 57) was 10.54 ± 3.92 min (P < 0.05 compared with 1993).

After the 1993 audit, a hospital quality review study revealed that the most frequent cause of late OR starts at the SMBD-JGH was late arrival by the anaesthetist (31%) followed by late arrival by the patient (24%) late arrival by the surgeon (22%) and nurses not ready (8%). No reason was given for the remaining 14% of cases that started late. After the trial of education and scheduling changes, late arrivals by surgeons were the most frequent contributor to late OR starts (37%) followed by late arrivals by the anaesthetist (27%). Late arrivals by the patient to the holding area contributed to late OR starts (33%) but 60% of these times were from OPD patients (Table III).

Discussion

Use of a retrospective audit study design ensured that the recording of patient entry to the OR by the circulating nurse was unbiased by concerns of its being studied. We believe the times recorded for OR start times during both periods to have been the actual time of patient entry for this reason.

Our study found that organizational changes and education of nurses and attending anaesthetists and surgeons, decreased the percentage of delayed cases from 77.8 to 65.5%. Similarly the average time lost per delayed start decreased from 15.7 to 10.5 min. Other studies looking at improvement in cost awareness behaviour have also found that while some improvement occurs, education does not appear to be sufficient to eliminate waste.^{7,8} Our trial of education consisted of multiple discussions at the level of the Surgical committee, letters distributed to attending staff, and discussion at an anaesthesia department meeting. We reorganized our orderly schedules and OR protocols over May and June of 1995 to facilitate patient transport, further alerting OR personnel to the problem of late OR starts. We believe that every attending anaesthetist and surgeon and all OR nurses were made aware of the problem of late starts in our OR through these measures. While these manoeuvres might not have been rigorous, they were part of the day-to-day cost consciousness in our hospital. We think our educational process was adequate and that we made realistic progress in educating our OR

personnel regarding the waste of OR time through late starts. Subsequent to the second audit in October 1995, our continuous quality assurance programme revealed that the remaining delays were mostly due to late arrivals of attending anaesthetists and surgeons. We believe, therefore, that our observed improvement was due more to reorganization than to education.

While the per case time delay in our study is not large, together with between case time^{9,10} there is the potential of improving efficiency with additional cases being performed. A basic rule of economics dictates that more product per unit time results in a lower cost per product. Thus, it is unfortunate that efforts to improve the efficiency by correcting the problem of late starts using education and reorganization were only partially successful in our institution. Further study is necessary to assess the cost of late starts in an OR as well as methods to correct this chronic problem.

Acknowledgements

The authors gratefully acknowledge the secretarial assistance of Mrs. Sarah Scholl in the preparation of this manuscript. The authors also acknowledge the assistance of the Anaesthesia Technicians in data collection.

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