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IMPACT OF PRE-ANESTHESIA CLEARANCE (PAC) ON CANCELLATION RATE, SURGICAL DELAY, AND RELATIVE COST-BURDEN IN ELECTIVE SURGERY: A COMPARATIVE STUDY OF 2000 PATIENTS

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ABSTRACT

Background: Pre-anesthesia clearance (PAC) is widely used to risk-stratify patients before elective surgery, but its effect on same-day-cancellation-rate, delay-to-surgery, and relative-cost-burden is incompletely quantified. [1][2] **Objective:** To compare **rate of cancellation, delay of surgery, and relative cost-burden (%)** between **1000 patients admitted for elective surgery without PAC** and **1000 patients admitted after PAC clearance**. **Methods:** Prospective observational study of **2000 consecutive elective-surgical patients** (excluding major-oncological or cardiac-procedures) over 18 months in a tertiary-care hospital. Group-A: **no-PAC admission (n=1000)**; Group-B: **admission after PAC clearance (n=1000)**. Primary outcomes were **on-day-of-surgery-cancellation-rate and mean delay-to-surgery (days from planned-to-actual-surgery-date)**. Secondary outcomes included **relative-surgical-cost-burden (%) compared with Group-B** and **reason-for-cancellation.** Analyses were by chi-square, t-test, and logistic regression. **Results:** On-day-of-surgery-cancellation-rate was **14.3% (143/1000) in Group-A vs 1.8% (18/1000) in Group-B, p<0.001**. Odds of cancellation were **87% lower in Group-B (OR 0.13, 95% CI 0.08–0.21, p<0.001)** after adjustment for age, ASA-class, and surgery-type. Mean-delay-to-surgery was **1.8 days (SD 1.4) in Group-A vs 4.3 days (SD 2.6) in Group-B, p<0.001**, with delays in Group-B driven by PAC-processing-time. **Group-A had a 15% higher per-case-cost-burden than Group-B**, primarily due to unplanned investigations,

last-minute consultations, and prolonged bed-occupancy after admission. **Conclusions:** Admission of elective-surgical patients **after PAC clearance reduces same-day-cancellation-rate from 14.3% to 1.8%**, at the cost of **longer planned-delay but lower relative-cost-burden per case** compared with admission without PAC. Streamlining PAC-turnaround and selective-testing, within a pre-admission-pathway, can optimize cancellation-reduction and cost-efficiency in elective-surgery programmes.

KEYWORDS: Pre-anesthesia clearance; elective surgery; cancellation rate; surgical delay; cost-burden; patient safety.

1. INTRODUCTION

Pre-anesthesia clearance (PAC) is widely used in elective surgery to **identify comorbidities, optimize medical status, and reduce anesthetic-risk and postoperative-morbidity.** [1][3] Despite its widespread use, routes to admission differ across centers: some admit patients directly to the surgical ward and assess anesthesia-fitness in-hospital; others require **formal PAC clearance before admission.** [2][4]

Cancellations of elective surgeries on the day of surgery are a major problem, with reported rates ranging from **6–15%**, many of which are **medically or administratively preventable.** [1][5] In our unit, a 14.3% cancellation-rate without PAC aligns with these multicenter-estimates, whereas admission after PAC-clearance reduced cancellations to 1.8%.

Admitting patients **without PAC** often results in **"emergency-like" work-up after admission**, including last-minute-investigations, unplanned-consultations, and extended-ward-stays, which may increase **relative-cost-burden** despite lower upfront-testing. [1][6] In contrast, **PAC-clearance before admission** clusters testing and risk-optimization into a controlled pre-admission phase, but may extend **planned-admission-to-surgery-interval.** [7][8]

To quantify this trade-off, we conducted a **prospective observational study of 2000 elective-surgical patients**: **1000 admitted without prior PAC (Group-A)** and **1000 after formal PAC clearance (Group-B)**, comparing **cancellation-rate, delay-of-surgery, and relative-cost-burden (%)** to inform perioperative-planning and PAC-policy.

2. METHODS

2.1. Study design and setting

Prospective observational study in a tertiary-care teaching hospital, over **18 months**, in **general surgery, obstetrics-gynecology, and orthopedic-units**. A total of **2000 consecutive**

elective-surgical patients were enrolled, with **1000 allocated to Group-A (no-PAC admission)** and **1000 to Group-B (PAC-clearance before admission)** based on **predetermined admission-policy** (no randomization).

2.2. Patient selection

Inclusion: Adults (≥18 years) undergoing **elective, non-oncological, non-cardiac** surgery requiring admission.

Exclusion: emergency-surgery, major-oncological-procedures, revision-surgery, and patients with known pacing-dependence (pacemaker-reactivation or replacement).

2.3. Group definitions

Group-A (no-PAC admission, n=1000): Patients admitted to the surgical ward on the scheduled-admission-day; anesthesia-evaluation, investigations, and risk-modification carried out **during hospitalization**, often leading to same-day-cancellation if unfit or missing-tests.

Group-B (PAC-clearance before admission, n=1000): Patients underwent **PAC clinic visit 7–14 days before admission**, including history, examination, and selected investigations; only those **PAC-cleared** were then scheduled for admission and surgery.

The PAC-protocol followed **ASA-risk-stratification and guideline-driven testing**, avoiding unnecessary extensive-workup when low-risk. [3][1]

2.4. Outcome definitions

Primary outcomes:

On-day-of-surgery-cancellation-rate: proportion of patients whose surgery was cancelled on the planned-day despite admission.

Delay-of-surgery: number of days from **planned-surgery-date** to **actual-surgery-date** (0 = on-planned-day, >0 = delayed).

Secondary outcomes:

Relative-surgical-cost-burden (%) compared with Group-B (taken as 100%).

Reason-for-cancellation.

2.5. Sample size and statistics

Group-sizes of **1000 each** were chosen to detect a **7–8% absolute reduction in cancellation-rate** (anticipated 15% in Group-A vs 7% in Group-B) with 80% power and alpha 0.05.

Data were analyzed using **SPSS v26**. Categorical variables by **chi-square**, continuous variables by **independent-t-test**, and **multivariable-logistic-regression** adjusting for age, ASA-class, and surgery-type. $p<0.05$ was considered significant.

3. RESULTS

3.1. Baseline characteristics

Groups were comparable in **age (mean 46.2 vs 45.8 years, p=0.45)**, male-proportion **(49.6% vs 50.2%, p=0.79)**, ASA-class distribution, and surgery-type **(p>0.05)**.

3.2. Primary outcomes

Outcome	Group-A (no-PAC)	Group-B (PAC-clearance)	p-value
On-day-of-surgery cancellation rate	14.3% (143/1000)	1.8% (18/1000)	<0.001
Odds-of-cancellation (adjusted)	OR 1.00	OR 0.13 (CI 0.08–0.21)	<0.001
Mean delay-to-surgery (days)	1.8 (SD 1.4)	4.3 (SD 2.6)	<0.001
Mean delay (non-cancelled only)	1.1 (SD 0.9)	3.7 (SD 2.1)	<0.001

3.3. Reasons for cancellation

Group-A (no-PAC): 143 cancellations

- New acute illness: 34% (49/143)
- Missing or abnormal investigations: 29% (41/143)
- Hemodynamic instability or decompensated comorbidity: 17% (24/143)
- Administrative/operational delays: 20% (29/143)

Group-B (PAC-clearance, 18 cancellations):

- New acute medical change after PAC: 9/18 (50%)
- Patient-refusal or change of mind: 6/18 (33%)
- Theatre-or-bed-unavailability: 3/18 (17%)

Thus, PAC-clearance **greatly reduced preventable same-day-cancellations** traceable to missing-tests or unanticipated-medical-risk, shifting the remaining cancellations to **non-PAC-preventable factors**.

3.4. Cost-burden (reported as percent-change only)

Item	Group-A (no-PAC)	Group-B (PAC-clearance)	Interpretation
Relative per-case cost-burden	15% higher	100% (reference)	—

Group-B (PAC-clearance):

PAC-related investigations and clinic-fee accounted for **about 9% of total cost-burden**, with other components (theatre, ward, anesthesia, surgery) relatively predictable and stable.

Group-A (no-PAC):

PAC-related-testing was **negligible (<1% of cost-burden)**.

Extra **15% higher per-case-cost-burden** came mainly from:

Unplanned investigations and last-minute consultations **(+7 percentage-points)**.

Extended-bed-occupancy and unplanned-ICU-watch **(+5 percentage-points)**.

Wasted-theatre-time and overtime-staff-use **(+2 percentage-points)**.

Thus, although **Group-A avoided upfront PAC-testing**, the **overall per-case-cost-burden was 15% higher than Group-B**, predominantly due to **emergency-mode processing after admission** rather than planned-pre-operative-optimization.

4. DISCUSSION

This study shows that **admitting elective-surgical patients after PAC clearance reduces the on-day-of-surgery-cancellation-rate from 14.3% to 1.8%**, an **87% reduction in adjusted odds**, despite a **longer planned-delay-to-surgery (mean 4.3 vs 1.8 days)** and **15% lower relative-cost-burden per case** compared with admission without PAC.

In **Group-A (no-PAC admission)**, **two-thirds of cancellations were preventable** (new-illness, missing-tests, unstable-comorbidity), which aligns with multicenter-reports of 6–15% same-day-cancellation-rates when pre-operative assessment is not standardized. [1][2]

The 15% higher per-case-cost-burden in Group-A reflected **unplanned investigations, last-minute consultations, and extended bed-use after admission**, confirming the **high hidden cost of "emergency-on-admission" work-up.** [1][6]

In contrast, **Group-B (PAC-clearance)** absorbed a modest **PAC-related-cost-burden of about 9% of total**, but had **much lower avoidable-cancellations and more predictable-resources-use**, resulting in a net-15% saving in per-case-cost-burden despite the

planned-delay. [7][8] This pattern supports the view that **front-loading risk-assessment and testing before admission is more cost-efficient than reactive, in-hospital-work-up.**

From a health-system-perspective, **requiring PAC clearance before admission can substantially reduce same-day-surgery-cancellations and overall per-case-cost-burden**, provided PAC-turnaround is streamlined and testing is selective. Future work should evaluate **cost-effectiveness and patient-reported-outcome-measures** of full-PAC versus risk-stratified-PAC-models in different surgical-cohorts, with a focus on **minimizing delay while preserving cancellation-reduction.** [1][8]

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