ORIGINAL ARTICLE

Utility of a preoperative assessment clinic in a tertiary care hospital

CME

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Objectives To assess the utilisation rate of a preoperative assessment clinic and its impact on length of stay and discharge destinations.

Design Retrospective case series with internal comparisons.

Setting A tertiary hospital in Hong Kong.

Patients All medical records of elective surgical admissions to a hospital in Hong Kong from April to June 2008 were retrieved. Medical records of patients who did not attend the preoperative assessment clinic were further reviewed by surgeons to assess if the patients could have been referred to the clinic.

Main outcome measures Total length of stay, preoperative and postoperative length of stay, and the discharge destinations of the patients attending and not attending the clinic were compared.

Results In all, 640 patients underwent elective operations, of whom 22 (3%) patients were seen in the preoperative assessment clinic. In patients who had a major operation, the mean (standard deviation) total length of stays for clinic attenders and non-attenders were: 5.2 (3.6) versus 13.2 (18.8) days (P<0.001). The respective figures for preoperative and postoperative length of stay were: 1.3 (2.3) versus 4.5 (8.9) days (P=0.001), and 3.9 (2.9) versus 8.7 (14.5) days (P<0.001). For patients who had an intermediate operation, the respective mean (standard deviation) length of hospital stays were 2.4 (2.0) versus 7.3 (13.9) days (P=0.002) and the figures for postoperative length of stays were 1.3 (0.5) versus 4.5 (9.3) days (P=0.001). Surgeons had classified 108 (17%) of the cases as possible preoperative assessment clinic users. Among the latter, 71 (66%) had no special reason to stay in the hospital. The discharge destination was not associated with the use of preoperative assessment clinic for patients having major (Chi squared=0.18, P=0.912) or intermediate (Chi squared=0.34, P=0.468) operations.

Conclusion Successful implementation of preoperative assessment clinic service requires close collaboration between surgeons, anaesthetists, clinicians, and also the re-engineering of health service delivery.

Key words
Length of stay; Outcome and process assessment (health care); Patient discharge; Preoperative care; Surgical procedures, operative

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New knowledge added by this study

- The utilisation rate of a preoperative assessment clinic (POAC) in a tertiary hospital was low; only 3% of all elective admissions attended.
- For patients who had a major or intermediate operations, the total length of stay was significantly shorter for those who used the service as opposed to those who did not, while the discharge destination was not affected by the use of the POAC service.

Implications for clinical practice or policy

- The findings of this pilot study provides evidence to convince surgeons and anaesthetists to increase POAC use for preoperative assessment.

Introduction

Preoperative assessment is an important process to ensure physiological and psychological fitness for anaesthesia and surgery. In Hong Kong, most elective surgical patients are admitted to hospital a day before surgery to undergo anaesthetic assessment. However, increasing evidence suggests that in-patient evaluations do not reduce day-of-surgery cancellations significantly, because they may not optimise patient co-morbidities

在第三層醫療服務醫院的一所術前評估中心的使用

目的 探討一所術前評估中心的使用率及其對病人住院期長短和出院目的地的影響。

設計 回顧性病例系列的內部比較。

安排 香港一所提供第三層醫療服務的醫院。

患者 審閱2008年4月至6月期間因須進行選擇性手術而入院的所有病人的紀錄。並由外科醫生進一步審閱那些未有使用術前評估中心的病人紀錄，以評估病人是否適合轉介使用術前評估中心。

主要結果測量 住院期總日數、術前及術後的住院日數，並比較術前評估中心的使用者和非使用者的出院目的地。

結果 研究期間共640名病人進行選擇性手術，其中22名（3%）曾使用術前評估中心。以下是比較術前評估中心的使用者和非使用者的數據：接受大型手術的病人的平均住院期分別為5.2（標準差3.6）天及13.2（標準差18.8）天（P<0.001），術前住院期分別為1.3（標準差2.3）天及4.5（標準差8.9）天（P=0.001），術後住院期分別為3.9（標準差2.9）天及8.7（標準差14.5）天（P<0.001）；而接受中型手術的病人的平均住院期分別為2.4（標準差2.0）天及7.3（標準差13.9）天（P=0.002），術後住院期分別為1.3（標準差0.5）天及4.5（標準差9.3）天（P=0.001）。外科醫生把108個病例（17%）界定為可使用術前評估中心；在這些病例中，71例（66%）並無特別原因留院。然而，無論接受大型手術（χ^2=0.18，P=0.912）或接受中型手術（χ^2=0.34，P=0.468）的病人，他們使用或非使用術前評估中心與出院目的地都沒有明顯關係。

結論 要成功引入術前評估中心的服務有賴外科醫生、麻醉科醫生和臨床醫生的緊密合作，並須重整提供醫療服務的模式。

effectively[1] and hospital administrative processes may create problems.[2]

The development of a preoperative assessment clinic (POAC) for patients booked for surgery is one of the most prevalent recent topics, although the idea was proposed more than five decades ago.[3] Patients undergo medical and anaesthetic assessment in the POAC so that their conditions can be optimised and anaesthetic procedures planned ahead of time. Such clinics have the potential to reduce length of stay (LOS) in hospital and costs, and hence enhance quality of care.

Hong Kong has a dual (public sector and a private sector) health care system. Most in-patient secondary and tertiary care is delivered through the public system.[4] The Hospital Authority (HA) is the largest public health service provider in Hong Kong, through seven clusters each with their own regional hospitals serving inhabitants in their respective districts. The Prince of Wales Hospital (PWH) is a teaching hospital and tertiary referral centre serving more than one million persons in just one of these clusters. The PWH has introduced a POAC since 2006, however, there has been no proper assessment of its performance. The current study was therefore conducted as a pilot to provide important information on the utilisation of the POAC in our locality. The objectives were: (1) to assess the utilisation rate of the POAC, and (2) to determine the impact of POAC on total, preoperative, and postoperative hospital LOS, and (3) discharge destination of the patients.

Methods

Setting and patients

This study was a two-stage analysis. We first reviewed all medical records of elective surgical admissions to the PWH from April to June 2008. All eligible patients were identified from the Clinical Data Analysis and Reporting System of the HA and operation lists were retrieved with the aim of collecting relevant data on all elective surgical admissions. Information obtained from medical records was used to determine the use of POAC on that admission. Patient demographics including age and gender, surgical diagnosis, types of anaesthetic used, magnitude of the operation, preoperative and postoperative LOS, and the destination on discharge were also collected.

Regarding patients who did not use the POAC service on that admission, their medical records were further reviewed by experienced surgeons based on their consensus of practice, to assess if they could have been referred for POAC assessment and same-day surgery admission. The criteria included both patient- and surgeon-associated factors. In patients whose medical condition was optimised and stable, there could be no need for prior special preoperative preparation. For example, surgical procedures may require bowel preparation, pacemakers may need reprogramming, and oral anti-coagulants may have to be suspended. Apart from clinical factors, logistic factors had to be considered, and included suitable social condition of the patient, and appropriate timing for POAC referral. The results of such evaluations were sent to the relevant consultant surgeon for final approval.

Statistical analysis

Patient characteristics were determined using descriptive statistics. *T* tests and Chi squared analyses were used to assess differences between POAC and non-POAC users with respect to total LOS, preoperative LOS, postoperative LOS, magnitude of the operation, and the destination on discharge. Statistical significance was set at P<0.05.

Results

Between April and June 2008, there were 640 patients who underwent elective operations. Their mean age was 50 years, and there was a predominance of males (64%). Of 640 patients, 219 (34%) had an ultra-major operations, 256 (40%) patients had major operations, 109 (17%) had intermediate operations, and 56 (9%) had a minor operation. In all, 576 (90%) were discharged home, 56 (9%) were transferred to a convalescent facility; only 6 (1%) died during the admission, and in 2 (0.3%) the discharge destination could not be determined. However, only 22 (3%) of these patients had been assessed in the POAC before their operation (Fig).

As there was only one patient who had a minor operation and none having ultra-major operation who attended the POAC, we focused on those having major or intermediate category operations. Table 1 shows the LOS patterns in those who used the POAC service and those who did not. Among those having major operations, respective mean ± standard deviation values for total LOS were 5.2 ± 3.6 versus 13.2 ±18.8 (P<0.001), for preoperative LOS were 1.3 ± 2.3 versus 4.5 ± 8.9 (P=0.001), and for postoperative LOS were 3.9 ± 2.9 versus 8.7 ± 14.5 (P<0.001). Thus all mean LOS values were significantly shorter in those who used the POAC service (n=13) than those who did not (n=241). Similar results were encountered for intermediate category operations; corresponding values for total LOS were 2.4 ± 2.0 versus 7.3 ± 13.9 (P=0.002) and for postoperative LOS were 1.3 ± 0.5 versus 4.5 ± 9.3 (P=0.001), there being eight such patients who used the POAC service compared to 101 who did not. The corresponding values for preoperative LOS in those who used the POAC service were also shorter than those who did not (1.1 ± 1.9 versus 2.8 ± 5.5), but the difference was not statistically significant (P=0.065).

Table 2 shows the discharge destination of patients who used and did not use the POAC service. Notably, the discharge destination was not associated with the use of POAC services for patients having major (χ^2=0.18, P=0.912) or intermediate (χ^2=0.34, P=0.468) operations.

The 618 patients who did not use the POAC were further reviewed by experienced surgeons based on their consensus of practice in the department. Among these, 510 (83%) were classified as not suitable for POAC assessment, while 108 (17%) appeared possibly suitable. Among all possible candidates for POAC, only six (6%) were admitted for special reasons, which could not have been resolved in the POAC. Whereas 27 (25%) were admitted for anaesthetic assessment, and 71 (66%) had no special reason to stay in the hospital. Four (4%) enjoyed home leave before the operation.

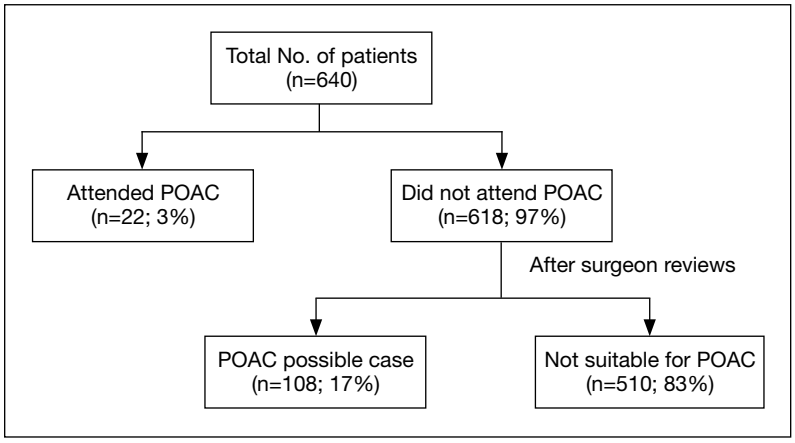

FIG. Flowchart of the procedures of medical record retrieval and surgeon review; POAC denotes preoperative assessment clinic

TABLE 1. Comparison of total LOS, preoperative LOS and postoperative LOS of patients attending and not attending POAC (classified by OT magnitude) using *T*-test*

LOS (days)	Mean ± standard deviation		P value
	POAC	Non-POAC (no & possible)	
All patients	n=22	n=616†	
Total LOS	4.0 ± 3.3	13.7 ± 20.2	<0.001
Pre-op LOS	1.2 ± 2.1	4.3 ± 9.7	<0.001
Post-op LOS	2.8 ± 2.6	10.0 ± 15.4	<0.001
OT magnitude: major	n=13	n=241†	
Total LOS	5.2 ± 3.6	13.2 ± 18.8	<0.001
Pre-op LOS	1.3 ± 2.3	4.5 ± 8.9	0.001
Post-op LOS	3.9 ± 2.9	8.7 ± 14.5	<0.001
OT magnitude: intermediate	n=8	n=101	
Total LOS	2.4 ± 2.0	7.3 ± 13.9	0.002
Pre-op LOS	1.1 ± 1.9	2.8 ± 5.5	0.065
Post-op LOS	1.3 ± 0.5	4.5 ± 9.3	0.001

* LOS denotes length of stay, POAC preoperative assessment clinic, and OT operating theatre
† Data were missing in two patients

TABLE 2. Comparison of discharge destination of patients attending and not attending POAC (classified by OT magnitude) using Chi squared test*

Discharge destination	POAC	Non-POAC (no and possible)	χ^2	P value
OT magnitude: major				
Home	12 (92%)	225† (93%)	0.18	0.912
Transferred to convalescent	1 (8%)	14 (6%)		
Death	0	2 (1%)		
OT magnitude: intermediate				
Home	7 (88%)	94 (93%)	0.34	0.468
Transferred to convalescent	1 (13%)	7 (7%)		
Death	0	0		

* POAC denotes preoperative assessment clinic, and OT operating theatre
† Data were missing in two patients

Discussion

The POAC is not a new concept for health service delivery. With the increase in health care expenditure, re-engineering the pre-admission process has been developed so that preoperative assessment was not only confined to 'in-patient' care, but extended to the out-patient setting.[5] A study in the US showed that a POAC was associated with a 12% increase in operating room caseload in the first 2 years without an increase in personnel numbers,[6] and day-of-surgery cancellations were reduced by 88%.[7] In Hong Kong, the concept of a POAC has been promoted for only a few years. However, the pattern of POAC service use remains uncertain. This study was a pilot that provided important information on its utilisation in a local tertiary care hospital.

Our study found that POAC utilisation was exceedingly low, being only approximately 3% of all elective admissions. This was comparable to POAC utilisation of 3% for a hospital in Toronto, after it first introduced the service in 1990.[8] However, since then POAC utilisation is much greater, such that the practice is now regarded as routine for preoperative assessment. In a tertiary care hospital in Canada, 60% of surgical cases were referred to the POAC[9] and in the US, up to 60% of patients were admitted for same-day surgery.[10]

We found that patients assessed in the POAC had a significantly shorter LOS, in terms of both preoperative and postoperative LOS. The findings were similar for both patients having major and intermediate operations. The preoperative LOS was expected to be shorter because patients assessed in the POAC would normally be admitted to the hospital on the same day as the surgery. Interestingly, even after adjustment of the operation by category, postoperative LOS for individual categories were still significantly shorter in POAC attenders. Possible reasons include: (1) non-POAC patients normally have a 'longer stay' in the hospital for the preoperative assessment, and consequently (2) a longer time exposed to the general risks of hospital-acquired pneumonia and falls (in unfamiliar environments).[11-14] Besides, subjects who were assessed in the POAC had their clinical conditions better optimised, and the whole operative process (including the postoperative care) was better planned to enable earlier discharge.[15,16] Since the current patient cohort was a mixed bag of patients and the number of POAC cases was relatively small, it was difficult to confirm such effects.

Owing to the diversity of the operations, there was no single indicator reflecting the clinical outcome. As a proxy, we used the discharge destination, but in this respect POAC cases showed no significant difference from the remainder. Previous studies have shown that the use of POAC had a positive impact on both clinical measures and patient quality of life, and reduced the LOS.[17,18] In POAC attenders, perioperative complication rates were found to be unchanged[19] but mortality has been reported to be lower.[20]

In our study, around one-fifth of non-POAC cases could have been assessed in the POAC preoperatively. Among these, the majority had no special clinical reason for not attending the POAC. A quarter of them were waiting to be admitted as in-patients for surgical and anaesthetic assessment and would normally be granted home leave after being assessed. By using the POAC, early admission for preoperative assessment and bed-utilisation efficiency improved by reducing preoperative hospital LOS. Moreover, there is evidence that POAC attendance can significantly lower case cancellations and delays in surgery, particularly for medical reasons.[8,18,21,22] Cancellations and surgical delays can be due to incomplete or abnormal laboratory work, inadequate assessments, consent form discrepancies, or non-compliance with preoperative instructions. These problems can be minimised by using POACs and can result in savings of US$1400-1700 per operating room cancellation.[21]

The low utilisation rate of the POAC in our setting might be due to the prevailing practice, as many surgeons held the traditional concept that patients had to be admitted for preoperative assessment. Besides, there was insufficient day admission coordination between different sub-specialties and the operating theatres. Consequently, surgeons might have feared missing out on theatre time for non-admitted patients, and that they might not be 'ready' for surgery. Input from anaesthetists may help to clarify medical and anaesthetic considerations of patient suitability for POAC referral and same-day surgery admissions. Regarding social factors, western studies have shown that patients are less likely to visit a POAC prior to surgery if their place of residence was far from the clinic.[23] In Hong Kong, there are no such rural or remote areas, though transportation or escort service arrangements for elderly patients is a common problem possibly affecting their attendance at POACs.

Another reason for low POAC utilisation in the PWH was that it only operated on five afternoon sessions per week. Moreover, there was also no designated day-care facility for patients using POAC. Conceivably, availability of more POAC sessions and a day-care facility might facilitate more referrals.

Limitations

As this was a retrospective study, not all clinical outcomes could be retrieved for analysis. If the comorbidity data of the patients were available, their pre-morbid status could be appreciated more clearly.

The low utilisation of the POAC, being a common observation during introduction of such service,[8] causes a disproportionate distribution of POAC users and non-users.

Conclusions

Although only 3% of patients who had undergone elective operations were assessed by the POAC, our findings provide important evidence in support of their use. Use of POACs for preoperative assessment is a modern trend around the world, and successful implementation requires close collaboration among surgeons, anaesthetists and clinicians, and also the re-engineering of health service delivery. This study provides reassuring evidence to convince practising surgeons and anaesthetists to increase POAC utilisation, so that further cost-savings can be achieved in the health care system, particularly with respect to surgical patients.

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