

The Incidence of Unplanned Admissions Following Ambulatory Surgery at Ramathibodi Hospital

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Background: Ambulatory surgery in Ramathibodi Hospital continues to grow and becomes more common because of its cost-effectiveness, convenience, and patient preference. However, there is a need for good system management. Unplanned admissions following ambulatory surgery, in part, reflects the quality of care.

Objective: Determine the recent incidences of and reasons for anesthesia related to unplanned admissions. The secondary outcome was to determine factors and complications following ambulatory surgery at Ramathibodi Hospital.

Material and Method: A retrospective study was conducted by reviewing medical records of all unplanned admissions between 2008 and 2012 in Ramathibodi Hospital.

Results: Over the five-year period, 10,489 patients underwent ambulatory surgery, 67 of whom were admitted for anesthesia-related reasons. The incidence rate of anesthesia related to unplanned admissions was 0.64% (67/10,489). The most common indications for admission were intractable vomiting (40.30%), dizziness (19.40%), and somnolence (8.96%). Most of the complications were nausea, vomiting, pain, and dizziness. The majority of the admitted patients were female and aged 41 to 50 years (29%), and 88% had ASA physical status class I or II. Gynecological patients had the highest unplanned admission rate (35.82%). None of the patients developed cardiac arrest or died.

Conclusion: The recent incidence rate of unplanned admissions at Ramathibodi Hospital was 0.64%. The most common reason and complication was intractable vomiting. Factors that might be related to unplanned admissions were female gender, age between 41 and 50 years, ASA physical status I or II, and gynecological patients.

Keywords: Ambulatory surgery, Day surgery, Unplanned admission, Anesthesia for OPD patient

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The popularity of ambulatory surgery continues to increase due to its cost effectiveness, convenience, and patient preference^(1,2). With ongoing advancements in anesthetic techniques and the introduction of minimally invasive surgical procedures, day surgery facilities are growing, in both quantity and complexity. As a result, there is a need to maintain good quality of care.

Unplanned admission following day surgery is an unwelcome event, both for patients and medical care providers. The overall incidence of unplanned admissions is 0.28 to 1.34%⁽³⁾. In many series, the main reasons for admission are adverse surgical events (38-58%), followed by anesthesia-related conditions (25-37%), medical reasons (17%), and social problems (4.6-19.5%)^(4,5).

Unplanned admission rate is one measure of the quality of ambulatory surgery. When assessing the unplanned admission rate, the various reasons for admissions should be explored in order to identify the preventable elements and find solutions to avoid them⁽⁶⁻⁸⁾.

The primary aim of the present study is to determine the recent incidence rate and reasons for anesthesia-related unplanned admissions at Ramathibodi Hospital. The secondary aim is to determine factors and complications following ambulatory surgery.

Material and Method

After obtaining approval from the local ethics committee, we retrospectively collected the data on all patients who were admitted to the post-anesthesia care unit (PACU) on unplanned basis for anesthesia-related reasons after undergoing ambulatory surgeries. The characteristics of the subject population include patients regardless of age, sex, and health status. Pregnancy women and patients who were unplanned

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admitted after undergoing ambulatory by other reasons were not included to the present study.

The definition of ambulatory surgery is an elective surgery done in one day; the patient arrives, undergoes surgery, and is discharged on the same day.

The authors collected data for a five-year period, between January 2008 and December 2012. The demographic data of the patients, anesthesia records, operative notes, and reasons for admission were obtained from the case notes of all the patients who were admitted to the inpatient ward.

Results are shown as mean \pm SD for quantitative variables and as relative frequency and percentage for qualitative variables. Data were analyzed using the software package SPSS version 20.0 for Windows.

Results

Over the five-year period, 10,489 patients underwent ambulatory surgery, 67 of whom were admitted for anesthesia-related reasons. Of the patients who were admitted, 60 were women (89.55%) and seven were men (10.45%); their mean age was 44 years. The physical statuses of the admitted patients were mainly American Society of Anesthesiologists (ASA) status I and II (88.06%). The median duration of the surgery was 60 minutes (range, 15 to 135 minutes). The demographic data of these patients were shown in Table 1.

Of the 67 admitted patients, 42 of the surgeries (62.69%) were performed under general anesthesia, followed by total intravenous anesthesia (23.88%), brachial plexus block (7.46%), and combined general-regional anesthesia (2.94%). Details regarding anesthetic agents, neuromuscular blocking agents, narcotic analgesics, opioids, and adjuvant drugs were presented in Table 2. Propofol was the drug used most often for intravenous anesthesia (frequency, 42 times); Pentothal was used only 14 times. Succinylcholine was the muscle relaxant used most frequently for endotracheal intubation (frequency, 18 times). Nitrous oxide was the most frequently used inhalation agent (frequency, 41 times), followed by sevoflurane and isoflurane. Fentanyl was the most opioid used most frequently as analgesia (frequency, 53 times); only seven patients received a non-steroidal anti-inflammatory drug (NSAID) as an analgesic supplement.

Only 27 patients (41%) received an antiemetic drug for prophylaxis. Of these, 25 patients received one antiemetic agent and two patients received

two antiemetic agents. Ondansetron was the most frequently used antiemetic agent (frequency, 23 times), followed by dexamethasone and metoclopramide.

Of the 10,489 ambulatory surgery patients, 67 (0.64%) were unplanned admissions due to

Table 1. Demographic data of the study population

Characteristics	Total (n = 67)
Gender	
Male	7 (10.45%)
Female	60 (89.55%)
Age, years (mean \pm SD)	44 \pm 16
ASA PS	
1	27 (40.30%)
2	32 (47.76%)
3	7 (10.45%)
4	1 (1.49%)
Operative time, min (mean \pm SD)	67.27 \pm 29.3
PACU duration, min (mean \pm SD)	203 \pm 108

ASA PS = American Society of Anesthesiologists physical status; PACU = post anesthetic care unit

Data are n (%) or mean \pm SD

Table 2. Anesthetics and adjuvant agents

	Drugs	Frequency (times) (n = 67)
Anesthetics	Propofol	42
	Pentothal	14
	Midazolam	21
	Ketamine	7
	Diazepam	1
Muscle relaxant	Succinylcholine	18
	Atracurium	12
	Cisatracurium	2
Inhalation	Nitrous oxide	41
	Sevoflurane	37
	Isoflurane	3
	Desflurane	3
Opioid	Fentanyl	53
	Morphine	9
	Pethidine	3
Local anesthesia	Lidocaine	10
	Bupivacaine	7
Antiemetics	Ondansetron	23
	Dexamethasone	4
	Metoclopramide	2
NSAIDs	Parecoxib	6
	Ketorolac	1

NSAIDs = non-steroidal anti-inflammatory drugs

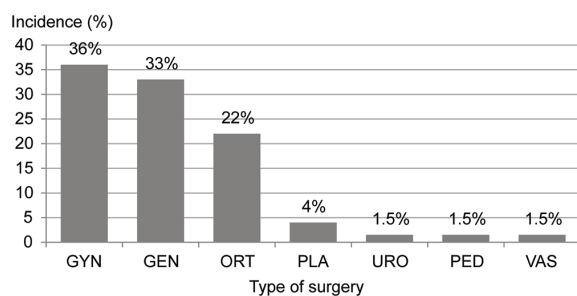
Data are presented as number count

anesthesia-related reasons. The main indications for admission were nausea and vomiting (40.3%), dizziness (19.4%), and drowsiness (8.96%), as shown in Table 3. There were six respiratory complications, two of which were due to upper airway obstruction that resolved after the anesthesia wore off. However, four of the respiratory complications were due to lower airway obstruction; most of the patients had an underlying respiratory disease, such as asthma, chronic obstructive pulmonary disease, or upper respiratory infection. All of these patients were resolved with medical treatment, and no patients in the present study needed reintubation.

In the present study, two arrhythmias were found during the intraoperative period and were resolved with medical treatment. The cause of arrhythmia was electrolyte imbalance. There were two complications following brachial plexus block. One was pneumothorax, and a chest tube insertion was required. The patient spent three nights in the surgical ward and was discharged without any further problems. The other complication was phrenic nerve paralysis: the patient complained of shortness of breath postoperatively. This patient spent only one night under observation, and was discharged the next day.

The most common anesthesia-related complications following ambulatory surgery were nausea and vomiting (frequency, 38 times); followed by pain (frequency, 27 times), and dizziness (frequency, 14 times), as shown in Table 4. None of the patients in this study developed cardiac arrest or died.

The three highest rates of unplanned admission according to surgical subspecialty were gynecologic surgery (36%), surgery (33%), and orthopedic surgery (22%), as summarized in Fig. 1.



GYN = gynecology surgery; GEN = general surgery; ORT = orthopedic surgery; PLA = plastic surgery; URO = urology surgery; PED = pediatric surgery; VAS = vascular surgery

Fig. 1 Incidence of unplanned admission according to surgical subspecialty (n = 67).

Table 3. Anesthetic-related reasons of unplanned admission

Reasons	No. of patients (n = 67)	Percent
Nausea and vomiting	27	40.30
Dizziness	13	19.40
Somnolence	6	8.96
Lower airway obstruction	4	5.97
Pain	4	5.97
Arrhythmia	2	2.99
Upper airway obstruction	2	2.99
Perioperative desaturation	2	2.99
Syncope	2	2.99
Observation after neuraxial block	2	2.99
Delirium emergence	1	1.49
Pneumothorax	1	1.49
Phrenic nerve paralysis	1	1.49

Table 4. Anesthetic related complications

Complications	Frequency (times) (n = 67)
Nausea and vomiting	38
Pain	27
Dizziness	14
Somnolence	6

Discussion

The popularity of ambulatory surgery has grown rapidly throughout the world, as it relieves the demand for hospital beds and makes the surgical process more convenient for the patient. Therefore, it is very important to monitor and maintain good quality of care in ambulatory surgery. Analysis of the reasons for unplanned admission is very important; to improve the efficiency of ambulatory surgical centers, the preventable causes should be identified and avoided.

The overall unanticipated admission rate related to anesthesia in the present study was 0.64%, which compares well with the results of other large series^(3,6,7). In our study, nausea and vomiting accounted for 40.3% of unplanned admissions, which was much higher compared to a previous study, in which the incidence was only 14.4%⁽⁸⁾. During the present study period, no routine antiemetic prophylaxis was used. Only 41% of the patients received an antiemetic as a prophylaxis therapy. Apfel et al⁽⁹⁾ identified the following four risk factors of postoperative nausea and

vomiting: female gender, history of motion sickness or postoperative nausea vomiting (PONV), non-smoking status, and use of postoperative opioids. In addition, other risk factors have been broadly identified, such as anesthetic technique, including the use of inhalation agents and nitrous oxide, and intraoperative and postoperative opioid use^(10,11). Most of the patients in our study were female, the anesthetic technique used primarily was general anesthesia, and the majority of the postoperative analgesics were opioids. Only 10% of the patients received NSAIDs as an adjuvant analgesia. As a result, our practice should identify patient risk factors, and multimodal approaches should be introduced for both PONV and pain management, as they have been shown to improve the efficacy of treatment and reduce side effects in high-risk patients⁽¹²⁾. According to the multimodal approach strategy, our practice should reduce the use of opioids by using more adjuvant analgesic drugs (e.g., NSAIDs) or increase the use of regional nerve block as a sole or combined anesthesia. Moreover, PONV also related to operative time and type of surgery⁽¹³⁾; as each 30 minute increase in duration increases PONV risk by 60%⁽¹⁴⁾. According to type of surgery, these were included laparoscopy, ear-nose-throat, neurosurgery, breast, strabismus, laparotomy, and plastic surgery⁽¹⁴⁻¹⁶⁾. Comparing to our study, one of the most common types of surgery in sub-group analysis was breast surgery. Therefore our practice should be identified and minimize the intraoperative factors that can increase PONV; thus, inhalation anesthetics and nitrous oxide should be avoided. Moreover, prophylaxis antiemetic drugs should be given to moderate to high-risk patients.

In the present study, the authors also found a 5.97% rate of lower airway complications; however, most of the patients had a previous history of respiratory disease. Arrhythmias caused by electrolyte imbalance were found in two cases (2.98%). Therefore, proper selection and preoperative preparation of the patients, as well as strict criteria for safe discharge after day surgery are mandatory for the patient's safety and satisfaction⁽¹⁷⁾.

Pneumothorax was found in one case (1.45%) following brachial plexus block. This was much higher compared with a previous study that reported a 0.7% rate⁽¹⁸⁾. However, this complication could be reduced by using ultrasound to localize the brachial plexus. Ultrasound allows visualization of veins, arteries, nerves, and other soft tissues, and thus, improves placement accuracy when compared with classical techniques. Ultrasound-assisted placement of blocks

results in fewer complications, increased patient satisfaction, and improved quality of the blocks⁽¹⁹⁻²²⁾. Early detection of the complications that can occur during the postoperative period should also be emphasized.

In a prospective review of 15,172 outpatients, Fortier et al⁽⁸⁾ reported that the predictive factors of unanticipated admission following ambulatory surgery were male gender, ASA II and III, long duration of surgery (over 35 minutes) and ear-nose-throat surgery. In the present study, the factors that might be related to unplanned admission were female gender, 41 to 50 year-old age group, ASA I and II, and gynecologic surgery. The reason for these inconsistent results might be the difference in demographic data, as our study had a large proportion of females and patients in this age group.

The limitations of the present study were the retrospective design, as some data was missing. Moreover, this study focused only on anesthesia-related admissions and did not include other causes. Not all of the ambulatory patients were analyzed, and thus, the actual predictive factors of unplanned admission could not be identified. In the future, a prospective study should be conducted.

Conclusion

The recent incidence rate of unplanned admissions following ambulatory surgeries at Ramathibodi Hospital was 0.64%. The most common reason and complication was intractable vomiting. Factors that might be related to unplanned admissions were female gender, 41 to 50 year-old age group, ASA physical status I and II, and gynecological patients.

What is already known on this topic?

Unplanned admission rate is one measure of the quality of ambulatory surgery. We have already known the most common causes of unplanned admission, which were surgical, anesthetic and medical causes. Anesthetic cause was one of the main reasons for admission such as pain, nausea, and vomiting. Therefore, the various reasons for admissions should be explored so as to identify the preventable elements and find solutions to avoid them. However, not all of the studies were based on Thai population.

What this study adds?

The present study showed the recent incidence of anesthetic related unplanned admission following ambulatory surgery and identified the causes of

admission. Moreover, common complications were diagnosed which was mainly from nausea and vomiting. Ramathibodi Hospital should identify patient risk factors and multimodal approaches should be introduced to both PONV and pain management.

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Potential conflicts of interest

None.

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รายงานอุบัติการณ์การพ่นกในโรงพยาบาลโดยมิได้คาดการณ์มาก่อนของผู้ป่วยผ่าตัดแบบผู้ป่วยนอกที่มารับการบริการทางวิสัญญีที่โรงพยาบาลรามาริบัติ

วิรากร กุปิ่นไพฑูรย์, เทพรรัตน์ เลิศวิเศษธีรกุล, เพ็ญศิริ พุ่มหิรัญ, ลิษา สังข์คุ้ม

ภูมิหลัง: โรงพยาบาลรามาริบัติมีแนวโน้มทำการผ่าตัดแบบผู้ป่วยนอกมากขึ้น เนื่องด้วยความคุ้มค่า สะดวก และเป็นสิ่งที่พึงพอใจของผู้ป่วย แต่ทั้งนี้ย่อมต้องอาศัยการบริหารจัดการระบบเป็นอย่างดี โดยอัตราการนอนโรงพยาบาลโดยมิได้คาดการณ์มาก่อน เป็นปัจจัยบ่งบอกคุณภาพหนึ่งในแง่ของการให้บริการในผู้ป่วยกลุ่มนี้

วัตถุประสงค์: การศึกษานี้มีวัตถุประสงค์หลัก เพื่อทราบอุบัติการณ์และสาเหตุทางวิสัญญีที่เกี่ยวข้องในการเข้าพ่นกในโรงพยาบาลโดยมิได้คาดการณ์มาก่อนภายหลังการผ่าตัดแบบผู้ป่วยนอก ณ โรงพยาบาลรามาริบัติ วัตถุประสงค์รอง คือ เพื่อประเมินปัจจัยที่เกี่ยวข้องและภาวะแทรกซ้อนที่เกิดจากสาเหตุทางวิสัญญี

วัสดุและวิธีการ: เป็นการศึกษาข้อมูลย้อนหลัง (retrospective study) โดยรวบรวมข้อมูลผู้ป่วยที่เข้ารับการผ่าตัดแบบผู้ป่วยนอกที่เกิดอุบัติการณ์การพ่นกในโรงพยาบาลโดยมิได้คาดการณ์มาก่อน ณ โรงพยาบาลรามาริบัติ ตั้งแต่ปี พ.ศ. 2551 ถึง พ.ศ. 2555 ผลการศึกษา: ในช่วงเวลา 5 ปี มีผู้ป่วยที่มารับการผ่าตัดแบบผู้ป่วยนอก 10,489 ราย พบว่า มีผู้ป่วยเข้าพ่นกในโรงพยาบาลโดยมิได้คาดการณ์มาก่อน ด้วยสาเหตุทางวิสัญญี 67 ราย คิดเป็นอุบัติการณ์เท่ากับ ร้อยละ 0.64 (67/10,489) โดยสาเหตุหลักของการพ่นกในโรงพยาบาลโดยมิได้คาดการณ์มาก่อนเนื่องด้วยสาเหตุทางวิสัญญี ได้แก่ อาการคลื่นไส้อาเจียน (ร้อยละ 40.30) อาการมีนศีรษะ (ร้อยละ 19.40) และภาวะง่วงซึม (ร้อยละ 8.96) ภาวะแทรกซ้อนทางวิสัญญีที่พบมากที่สุด ได้แก่ อาการคลื่นไส้อาเจียน ความปวด และอาการเวียนศีรษะ โดยในการศึกษานี้ ผู้ป่วยส่วนใหญ่เป็นเพศหญิง ช่วงอายุระหว่าง 41-50 ปี และ ASA PS 1-2 ผู้ป่วยนรีเวชมีอัตราการพ่นกในโรงพยาบาลโดยมิได้คาดการณ์มาก่อนสูงสุด (ร้อยละ 35.82) ในการศึกษาครั้งนี้ไม่พบผู้ป่วยรายใดเกิดภาวะหัวใจหยุดเต้น หรือ การเสียชีวิต

สรุป: อุบัติการณ์ของผู้ป่วยที่เข้าพ่นกในโรงพยาบาลโดยมิได้คาดการณ์มาก่อนด้วยสาเหตุทางวิสัญญี ณ โรงพยาบาลรามาริบัติ คิดเป็นร้อยละ 0.64 สาเหตุหลักของการพ่นกในโรงพยาบาล ได้แก่ อาการคลื่นไส้อาเจียนและเวียนศีรษะ ภาวะแทรกซ้อนที่พบน้อย ได้แก่ อาการคลื่นไส้อาเจียน ความปวด และอาการเวียนศีรษะ โดยปัจจัยที่อาจมีผลต่อการพ่นกในโรงพยาบาลโดยมิได้คาดการณ์มาก่อน ได้แก่ เพศหญิง, ช่วงอายุระหว่าง 41-50 ปี, ASA PS 1-2 และการผ่าตัดทางนรีเวช
