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ORIGINAL ARTICLE

Post-operative nausea and vomiting prophylaxis in adult day case surgery: did it justify a local protocol?

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Background

Post-operative nausea and vomiting (PONV) is common following surgery and results in complications. The Society of Ambulatory Anaesthesia (SAMBA) published internationally established guidelines for its prophylaxis. Our aim was to investigate whether guidelines were being followed locally. We also assessed incidence of PONV, delay in discharge or unplanned admissions in adult surgical cases at Day Care Unit. This study was repeated after five years to assess the impact of establishing local guidelines in Mater Dei Hospital in the same year.

Methods

In this retrospective study, we collected information between August and September 2012 and then in 2017. Data regarding vomiting, delayed discharge or unplanned admission due to PONV was documented. Local guidelines were implemented in 2013. Educational measures to raise awareness were carried out, followed by a re-audit in 2017.

Results

195 patients were eligible in the first study and 173 in the second cycle. No statistically significant decrease was found between patients having PONV (12.4%and 10% in the re-audit - $p<0.01$). One in ten patients (1%) had an unplanned admission due to PONV during the first audit with no admissions in the second study. Number of risk factors for PONV did not correlate with anti-emetics given.

Conclusion

The incidence of PONV in adult day cases at our day care unit justifies the use of protocol for better prophylaxis. However, local protocols are not being followed. Education and emphasis of local guidelines can improve the compliance rate.

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Introduction

Post-operative nausea and vomiting (PONV), defined as occurring during the first 24 to 48 hours after surgery is the most frequent side effect after general anaesthesia. It is the least desirable outcome following surgery.[1] The incidence of vomiting and nausea is approximately 30% and 50% respectively, and this may be as high as 80% in high risk patients.[2]

PONV is also linked with an increase in health care cost. The increased expenditure is due to the treatment, delay in discharging of patients both in the acute recovery period and at day care unit and any unplanned admissions due to PONV.[3-6] Parra Sanchez et al. established in 2012 that PONV incurred an extra cost of 75 US dollars per patient in ambulatory day case surgery.[7] Another study, also in 2012, by Dzwonczyk et al. demonstrated that PONV prophylaxis yielded more profits for the hospital than treatment of patients who returned to hospital following day case surgery due to symptoms of PONV.[8] The concept of PONV incurring extra costs to both patients (mainly due to missed wages) and hospitals was already being studied in 1994 when Sanchez et al. published a study about these economic considerations in the Journal of Clinical Anaesthesia.[9]

In 2002, a multidisciplinary international panel of experts from the Society of Ambulatory Anaesthesia (SAMBA) was set up to review medical literature on PONV and to produce guidelines for management of PONV. The aim of these guidelines was to be reliable, clear and above all clinically applicable. The panel based their recommendations on the evidence regarding the prevention and the minimization of PONV. Their primary goals were to identify the primary risk factors both in adults and children, and to recognize the best approach to prevent PONV. A literature review helped to identify a list of the strongest risk factors, and this list was categorized into three groups; patient, anaesthetic and surgical- specific. For patients in whom the risk for PONV was low, the advice is just to watch; moderate risk necessitates 1 or 2 anti-emetics and a high risk would require 2 or 3 anti-emetics. Figure 1 below demonstrates these guidelines.[10]

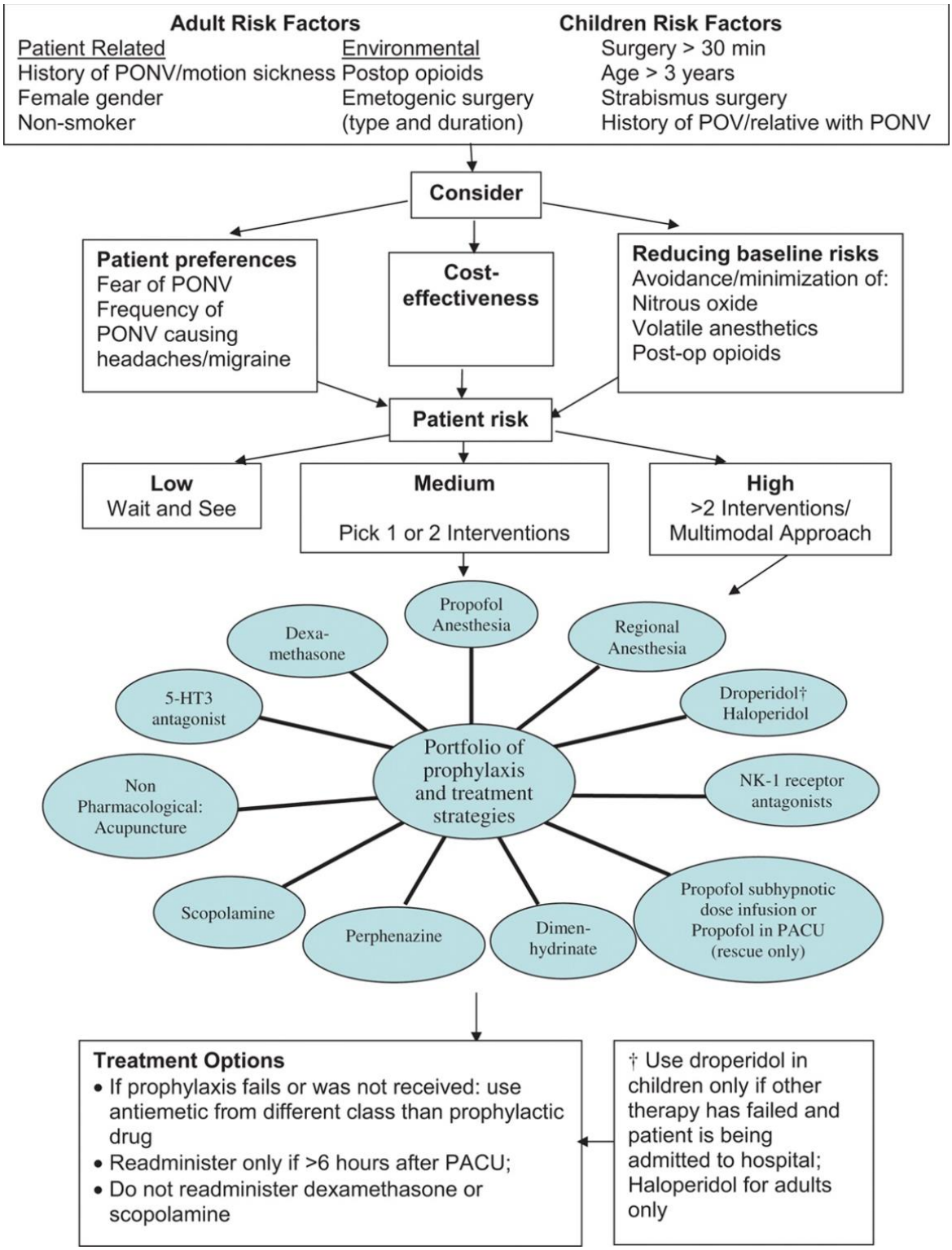
Local practice, at the time of the first cycle, did not follow any strategy both in the prevention and in the treatment of PONV. It was hence felt necessary to offer guiding principles for both prophylaxis and treatment of PONV, and in May 2014, a Guideline Development Group (GDG) produced evidence-based guideline for the management of PONV in patients undergoing Day Surgery procedures.

Why were local guidelines developed?

It is well known that PONV is a particularly challenging issue which has a bearing on both patient satisfaction and appropriate patient discharge. The goal of the recent local guidelines is to provide an easy and inclusive guide to anaesthetists, foundation doctors, anaesthetic and day care unit nurses in order to prevent and treat PONV in Adults undergoing day surgery effectively.

Figure 1 Society of Ambulatory Anaesthesia Guidelines for PONV Prophylaxis, 2002

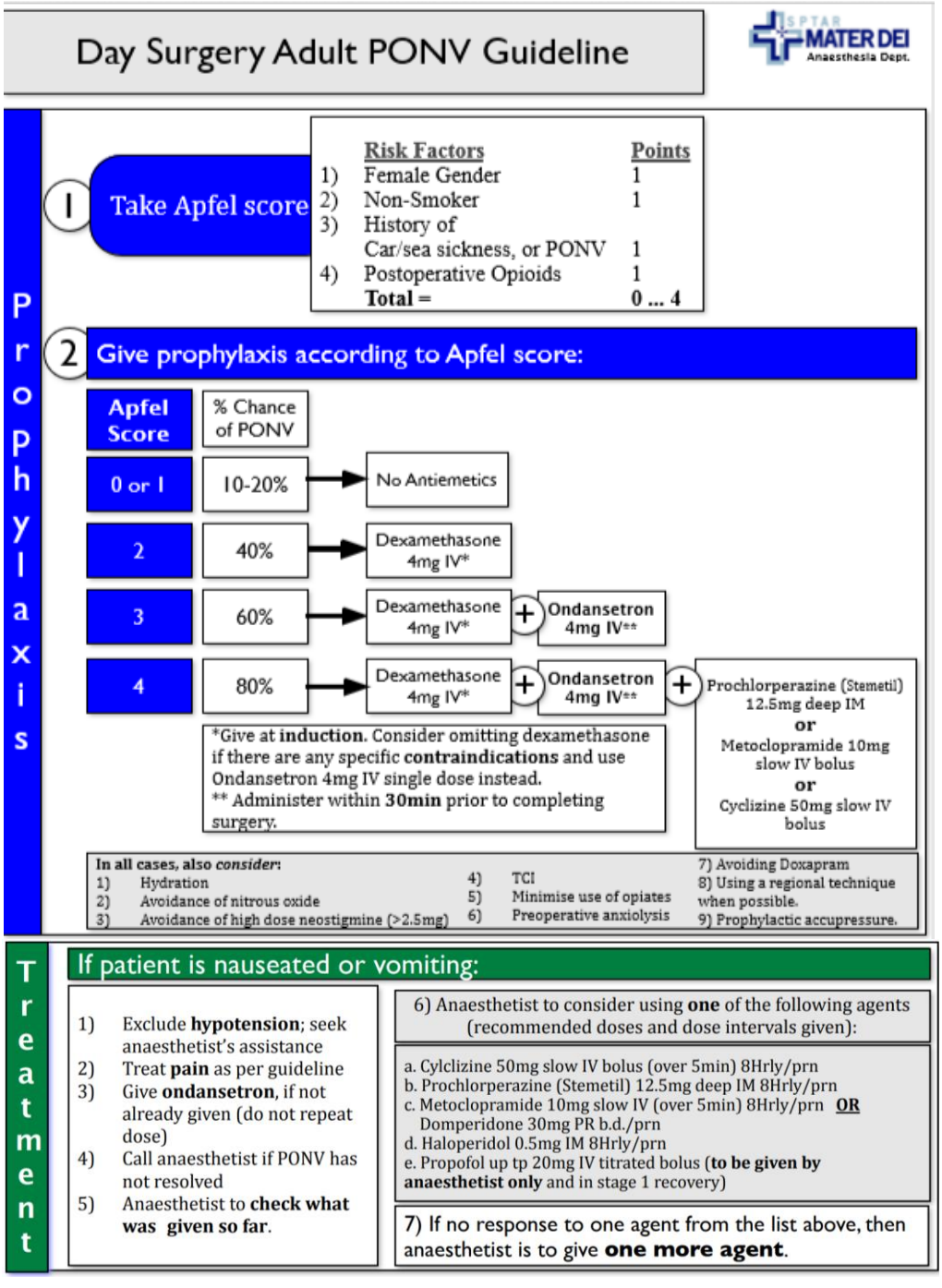
Why were local guidelines developed?



How does the local guideline differ from the existing guidelines issued by the SAMBA?

The SAMBA 2007 guidelines stratify the risk and management according to a rather complex flowchart. On the other hand, the local guidelines were simplified. These consist of two sections, with the first section stratifying patients depending on the Apfel score.[11] The prophylactic treatment is then given according to this scoring system, as per Figure 2 below. The second part addresses treatment of any postoperative nausea and vomiting which may occur in stage 1 recovery or DCU.

Figure 2 Local Guidelines for prophylaxis and treatment for PONV.



It was felt that it would be ideal to re-assess the situation before and after the introduction of the guideline, hence the purpose of this observational study

The objectives of the first audit done in 2012 were primarily to assess the local practice pattern of PONV prophylaxis and compare this with established international guidelines. Following the introduction of the local protocol for the prevention of PONV, the audit was repeated in 2017 to assess such local guidelines and their influence on PONV incidence. The local incidence of PONV, any delay in discharge or unexpected admissions secondary to PONV were also assessed.

METHODS

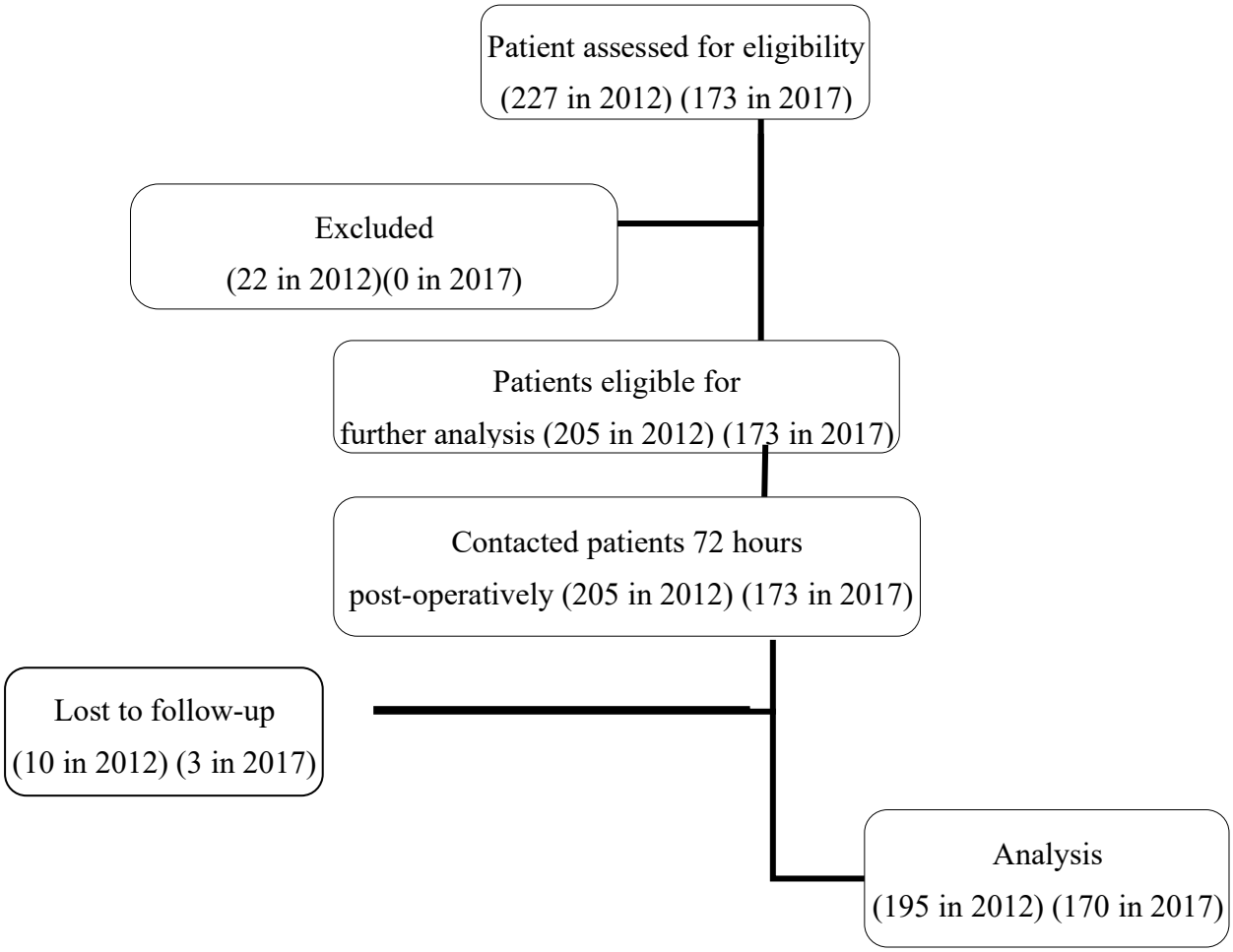
A retrospective audit of adult day care surgical procedures was performed at the Surgical Day Care Unit at Mater Dei Hospital. This was done over a period of 6 weeks between August and September 2012 and again between August and September 2017 Patients were included if they were older than 18 years of age, classified as ASA1 or 2, and were scheduled for elective surgical procedure under general anaesthesia.

Data collected included demographic information, which is depicted in Table 1. Any relevant notes in the patients' files including episodes of nausea or vomiting in recovery stay or at day care unit or any unplanned admissions were noted. Patients were also contacted by telephone 72 hours following surgery in order to confirm any post-operative nausea and vomiting. Data was collected on Microsoft Excel® (Microsoft, US), and analysed using IBM SPSS version 24 (IBM, US).

Table 1 Demographic data of patients included in this observational study

		Frequency		Percentage	
		2012	2017	2012	2017
Surgical Procedure	Gynaecology	96	64	44.1	37.6
	Hernia Repair	32	26	16.4	15.3
	Breast Surgery	6	6	3.1	3.5
	Orthopaedics	41	35	21	20.6
	Other	30	44	15.4	25.6
Age Group	36-45	50	32	25.6	18.8
	46-55	61	47	31.3	27.6
	56-65	31	37	15.9	21.8
	66-75	13	11	6.7	6.5
	75 and over	3	13	1.5	7.6
Gender	Female	135	113	69.2	66.5
	Male	70	60	30.8	33.5
Smoking	Yes	65	42	28.2	22.9
	No	140	131	71.8	77.1

Figure 3 Data collected and analysed in both audit cycles



Results

In total, 400 patients were assessed for eligibility, with data from 365 patients being analysed as shown in Figure 3 overleaf.

Demographic data for the two groups is shown in Table 1, with most of the patients being middle aged, female non-smokers. Most patients had risk factors for PONV. The incidence of PONV in 2012 was 12.8%. In 2017, this incidence was 10%. There was an overall use prophylactic anti-emetics in 51.1% of the total cohort.

Table 2 exhibits the number of patients receiving anti-emetic prophylaxis. Dexamethasone was the commonest drug used as prophylaxis, followed by Ondansetron, which had only been recently introduced in 2012. In all, the total number of doses of antiemetics given was 193.

The use of prophylactic drugs for the prevention of PONV was compared to the number of risk factors, especially for previous episodes of PONV. Overall, those patients who did have previous PONV received an antiemetic in 79.4% of cases, whereas 66.1% of cases received an antiemetic even if there was no history of PONV.

Local guidelines based on Apfel score were used as the audit standard for the second cycle of the audit.

Table 2 Anti-Emetic Doses given as prophylaxis

Anti-Emetic Drug	Number of Patients Given Prophylaxis	
	1st Cycle *n*=205	2nd Cycle *n*=173
Dexamethasone	40	105
Metoclopramide	5	9
Prochlorperazine	6	0
Ondansetron	16	12

Differences between the two cycles

As shown previously in Table 1, there were no particular differences in the demographic data for patients in the two groups.

The number of patients suffering PONV in the first cycle was 25 (12.8%), whereas that in the second cycle was 17 (10%). This was not statistically different.

The use of an antiemetic was much more common in the second cycle, than in the first: a total of 126 doses of an antiemetic were given in 105 patients (62%), compared to 67 doses in 53 patients (27%). Details of the use of antiemetics in each group is shown in Table 2.

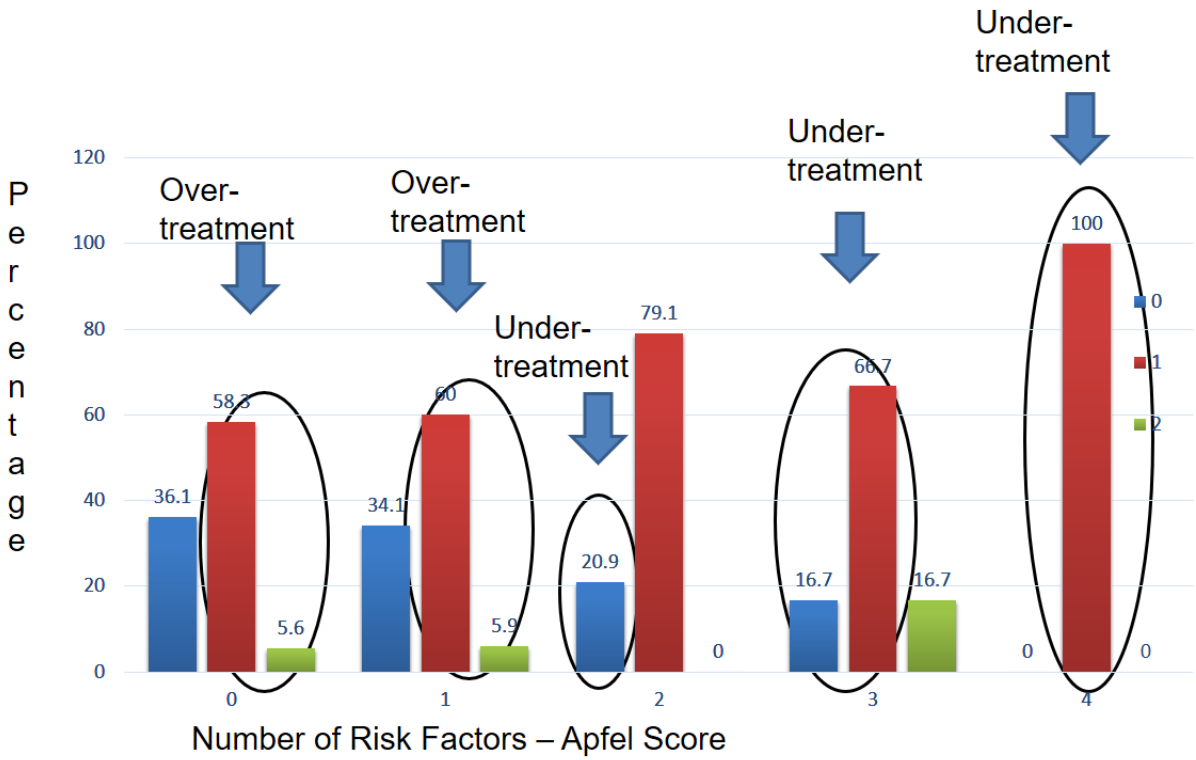
In the second cycle, despite the recommendations, 58% of patients still received an antiemetic, despite having an Apfel score of 0 or 1. A small fraction (6%) of these patients even received two antiemetics. This should be considered as inappropriate treatment, as the guidelines do not recommend anti-emetic prophylaxis for these patients. In total, 225 patients were over-treated. The total extra cost for said overtreatment was calculated at 184.34 euro, using procrurement prices for the antiemeitcs used.[12]

In groups of patients with Apfel score of 2, 79.1% of patients were given one anti-emetic and nobody was given two anti-emetics. Patients with an Apfel score of 3 were given one anti-emetic agent in 66.7% of cases and 16.7% received two anti-emetics.

All the patients with Apfel score of 4 were given one anti-emetic. These were supposed to receive more than one class of antiemetic, so these patients were undertreated.

In the second cycle, 9 patients were found to have no risk factors for PONV. A total of 17 patients (10%) experienced post-operative nausea and 11 patients (6.5%) actually vomited. Of these, 5% were given rescue anti-emetics in the recovery area (most common agent used being ondansetron) and 1% were given rescue treatment in day care unit (0.5% ranitidine and 0.5% ondansetron).

Figure 4 Overtreatment and Undertreatment of Patients based on Apfel Score



Discussion

Our study shows that the lack of local guidelines allowed for a variety of practices which were not based on evidence. However, the introduction of such local guidelines do not significantly improve adherence to established international guidelines.

The overall rate of PONV in our cohort of patients was 11%. This compares to other studies, such as by Gan et al, which quotes a figure of up to 30% in the US.[15]

The use of dexamethasone as an antiemetic is well-established.[16] It is considerably cheaper than ondansetron, and it also seems to improve analgesia.[17] This might have contributed to dexamethasone use being so prevalent, and to the overuse of this drug even if there was no specific indication.

It is disheartening to see that despite the introduction of a local policy, adherence after a year was so poor. A lot of patients received anti-emetics when not indicated, but a lot of patients also received too little when this was indicated. However, such an effect is not new.[19–21] Kooij et al studied PONV prophylaxis being prescribed preoperatively for patients with 3 or more risk factors. Only 35% of these patients were appropriately prescribed prophylaxis. They recommended that electronic alerts included in the preoperative system may improve these results.[19] Brampton et al carried out a yearly audit about incidence of PONV in their centre and the best rate of adherence to PONV prophylaxis guidelines was reported in 2012 when it was 67%.[20] In a multicenter observational study in 2013, White et al showed that maximal drop was obtained in PONV rates when more than three anti-

emetics were given to patients, however less than 70% adherence to hospital guidelines was noted.[21]

A number of limitations were identified related to this study. Firstly, ophthalmic and ENT surgery patients were not included since they do not attend day care unit even for day case procedures. These operations are generally known to carry significant risk of PONV. In our study, we did not differentiate between early or late PONV. Patient satisfaction with anti-emetic prophylaxis was not noted.

Pain scores were not taken into account during this study. Pain, especially if severe, can influence the perception of nausea and vomiting, and can also increase use of opiates.[22] Patient's overall satisfaction with their experience was also not included.

Improved awareness and education regarding PONV guidelines will help improve adherence. In some centres, computer systems are used in anaesthesia with automated reminders regarding PONV prophylaxis, and this has been shown to improve compliance.[23] These automated reminders may even be customized to request a reason for non-adherence to guidelines, and this has also improved compliance in itself.[24] Having guidelines in place for specific types of surgery which are considered high risk, such as breast and gynaecological surgery, may also help to improve outcomes.[25] Simplifying algorithms for PONV prophylaxis and treatment as much as possible has also been shown to help[26], however our local guideline is already quite simple at present.

This study highlighted the fact that locally, despite the introduction of new guidelines regarding prophylaxis and management of post-operative nausea and vomiting, adherence is still relatively poor and improvement is needed to avoid both over-treatment with its attendant costs as well as under-treatment with resulting morbidity.

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