

Add-on cases in the endoscopy unit: Factors that affect volume

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BACKGROUND: Although most procedures in the endoscopy clinic are elective, emergency add-on cases in hospital-based endoscopy clinics are common, frequently consuming a great deal of time and resources relative to elective endoscopy procedures.

OBJECTIVE: To determine which specific factors correlate with the high volume of add-on emergency cases in a tertiary care, hospital-based endoscopy unit.

METHODS: A retrospective chart review of all gastrointestinal add-on, and electively booked cases of esophagoduodenoscopy (EGD), colonoscopy (C) and flexible sigmoidoscopy (FS) procedures from September 2006, to May 2007 was conducted. The day of the week, month, type of procedure and physician were recorded. Emergency add-on procedures performed during the weekends were not assessed. These cases were then compared with elective cases during a similar time frame to determine differences in the aspects of add-on cases versus those that were elective.

RESULTS: Seven hundred twenty-one add-on cases were reviewed (mean patient age 57.4 years; 46% women) and compared with 736 elective cases (mean age 56 years; 49% women; P not significant). Of the add-on cases, 377 (52%) were EGD, 216 C (30%) and 105 (15%) were FS, with 23 combined procedures (3.2%) versus 202 (27%) EGD, 442 (60%) C and 74 (10%) FS in the elective group. Add-on cases were more likely to be EGDs than elective cases (OR 2.7; 95% CI 1.8 to 4.3; P<0.0001) and less likely to be Cs (OR 0.24; 95% CI 0.15 to 0.38; P<0.0001). There were significantly more add-on cases on Mondays (OR 1.7; 95% CI 1.0 to 2.28; P>0.03). Conversely, there were significantly fewer procedures added on Fridays (OR 0.31; 95% CI 0.16 to 0.57; P=0.0001). There were statistically fewer add-on cases in September compared with the other months that were evaluated (OR 0.31; 95% CI 0.11 to 0.78; P=0.0006).

CONCLUSION: With the present system of performing only emergency cases on the weekend, Monday tends to have more add-on cases. Consistent with the fact that upper gastrointestinal bleeding is the most common emergency condition, EGD is more common in add-on cases than with elective cases. Although speculative, the reasons for Friday having fewer add-on cases may be the result of a change of physician on call that day; consequently, most cases may be performed earlier in the week. For unknown reasons, fewer cases tend to be added on in September than in the other months evaluated. These data demonstrate that even in the same institution with similar patients, variability in the number of add-on cases likely is a result of many additional factors governing add-on cases, which require appropriate resource planning to ensure adequate allocation of services to ensure ideal patient care.

Key Words: Colonoscopy; Efficiency; Endoscopy; Esophagoduodenoscopy

Over the past several decades, endoscopic procedures have quickly evolved, expanding in both diagnostic and therapeutic avenues (1). In 2002, 1444 Canadian physicians performed a minimum of 100 procedures each, accounting for a sum of nearly one million procedures (2). The total number of

Des cas supplémentaires à l'unité d'endoscopie : Des facteurs qui influent sur le volume

HISTORIQUE : Même si la plupart des interventions en clinique d'endoscopie sont non urgentes, des cas supplémentaires d'urgence sont monnaie courante dans les cliniques hospitalières d'endoscopie et prennent souvent beaucoup de temps et de ressources relativement aux endoscopies non urgentes.

OBJECTIF : Déterminer les facteurs précis liés au fort volume de cas supplémentaires d'urgence dans une unité hospitalière d'endoscopie de soins tertiaires.

MÉTHODOLOGIE : Les auteurs ont procédé à l'examen rétrospectif des dossiers de tous les cas gastro-intestinaux ajoutés et non urgents ayant exigé une œsogastroduodénoscopie (OGD), une coloscopie (C) ou une sigmoïdoscopie flexible (SF) entre septembre 2006 et mai 2007. Ils ont pris note du jour de la semaine, du mois, du type d'intervention et du médecin. Les interventions supplémentaires d'urgence effectuées pendant la fin de semaine étaient exclues. Ces cas ont ensuite été comparés aux cas non urgents pendant une période similaire, pour déterminer les différences d'aspect entre les cas supplémentaires et les cas non urgents.

RÉSULTATS : Les auteurs ont examiné 721 cas supplémentaires (âge moyen des patients de 57,4 ans; 46 % de femmes) et les ont comparés à 736 cas non urgents (âge moyen de 56 ans, 49 % de femmes; P non significatif). Parmi les cas supplémentaires, 377 (52 %) étaient des OGD, 216 (30 %), des C, 105 (15 %), des SF et 23 (3,2 %), des interventions combinées, tandis que 202 (27 %) cas non urgents étaient des OGD, 442 (60 %), des C et 74 (10 %), des SF. Les cas supplémentaires étaient plus susceptibles d'être des OGD que les cas non urgents (RRR 2,7; 95 % IC 1,8 à 4,3; P<0,0001) et moins susceptibles d'être des C (RRR 0,24; 95 % IC 0,15 à 0,38; P<0,0001). Il y avait beaucoup plus de cas supplémentaires le lundi (RRR 1,7; 95 % IC 1,0 à 2,28; P>0,03). Par contre, beaucoup moins d'interventions étaient ajoutées le vendredi (RRR 0,31; 95 % IC 0,16 à 0,57; P=0,0001). Statistiquement, il y avait moins de cas supplémentaires en septembre que pendant les autres mois de l'évaluation (RRR 0,31; 95 % IC 0,11 à 0,78; P=0,0006).

CONCLUSION : Selon le présent système qui consiste à n'exécuter que des cas urgents pendant la fin de semaine, le lundi tend à comporter plus de cas supplémentaires. Conformément au fait que les hémorragies œsogastroduodénales sont les urgences les plus courantes, les OGD sont plus fréquentes dans le cadre des cas supplémentaires que des cas non urgents. Bien que l'explication soit spéculative, il se peut que moins de cas soient ajoutés le vendredi en raison du changement de garde ce jour-là. Ainsi, la plupart des cas auraient lieu plus tôt pendant la semaine. Pour des raisons inconnues, moins de cas tendent à s'ajouter en septembre qu'au cours des autres mois évalués. Ces données démontrent que, même dans un seul établissement auprès de patients similaires, la variabilité du nombre de cas supplémentaires résulte probablement de nombreux facteurs qui régissent ces cas, ce qui exige une planification pertinente des ressources pour garantir une attribution convenable des services afin de dispenser des soins idéaux aux patients.

colonoscopies reported was 523,224, while gastroscopies totaled slightly fewer at 392,568. Physicians who performed less than 100 procedures per year were not included in the report; therefore, these totals are likely an underestimate of the true procedure totals.

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TABLE 1
Elective versus add-on endoscopy cases

Variable	Elective cases (n=736)		Add on cases (n=721)	
	Mean	95% CI	Mean	95% CI
Age, years	56.0	55.0–57.0	57.4	56.2–58.6
Women, %	49.9	46.2–53.5	44.6	41.0–48.2
Procedure types, n				
EGD	202		377	
Colonoscopy	442		216	
Flexible sigmoidoscopy	74		105	
Combined procedures	18		23	
Day of the week				
Monday	123 (17)		177 (24.5)	
Tuesday	149 (20)		163 (22.6)	
Wednesday	156 (21)		189 (26.1)	
Thursday	115 (16)		107 (14.8)	
Friday	193 (26)		86 (11.9)	
Physician				
1	96 (13)		87 (12.2)	
2	49 (7)		74 (10.4)	
3	81 (11)		87 (12.2)	
4	156 (21)		111 (15.6)	
5	53 (7)		66 (9.3)	
6	141 (19)		132 (18.6)	
7	54 (7)		56 (7.9)	
8	106 (15)		98 (13.8)	
Long weekend, %	2.03	1.01–3.06	2.9	1.7–4.1
Month				
January	88 (12)		100 (13.9)	
February	93 (13)		100 (13.9)	
March	82 (11)		109 (15.1)	
April	92 (13)		91 (12.6)	
May	91 (12)		105 (14.5)	
September	81 (11)		40 (5.5)	
October	75 (10)		63 (8.7)	
November	72 (10)		57 (7.9)	
December	62 (8)		57 (7.9)	

Data are presented as n (%) unless specified otherwise. EGD Esophagogastroduodenoscopy

At St Paul's Hospital, Vancouver, British Columbia, a team of eight gastroenterologists complete approximately 10,000 gastrointestinal endoscopic procedures annually. Most of these procedures are electively scheduled, with patients (as outpatients) being discharged home the same day, typically within 1 h to 2 h of their procedure. Add-on procedures are usually emergency procedures and performed on inpatients. They require a significant allocation of endoscopy resources because they are urgent, patients are not readily discharged, tend to use more equipment and often involve endoscopic hemostasis. In addition, patients tend to be more acutely ill with significant comorbid disease and, therefore, higher risk. The addition of these patients to a typical endoscopy slate increase the workload and require careful planning to ensure that the consumption of resources remain within budgetary limits (3).

Because staffing is readily available during normal work hours, regularly scheduled cases performed during peak operational times in the gastroenterology (GI) clinic typically do not involve overtime requests which involve extraneous payroll costs. To specifically target overtime and resource costs, and properly allocate resources, it is of critical importance to actually recognize situations in which add-on cases are most prevalent. Efficiency in the endoscopy unit has been studied in many different ways (4-7). However, very few studies have addressed the issue of add-on cases (8-10). In an effort to determine factors that correlate with a high volume of add-on emergency cases, we retrospectively reviewed eight months of add-on and elective case data from a tertiary care, hospital-based endoscopy unit.

METHODS

A retrospective office chart review was performed on all non-emergent gastrointestinal endoscopy cases performed between September 2006 and May 2007 in the GI clinic at St. Paul's Hospital. For the purpose of the present study, the focus was on data from add-on and electively booked cases. Specifically, all gastroscopies, colonoscopies, and flexible sigmoidoscopies were reviewed. The day of the week and month a procedure was performed, type of procedure and physician were recorded. Emergency add-on cases were then compared with a randomly selected group of electively booked cases (during the same time period) to determine if differences in demographics or procedure type could be determined. It should be noted that emergency add-on procedures completed during the weekend were not assessed in the present study because our focus was the interaction of add-on cases with elective cases during the week.

The null hypothesis to compare physician add-on cases was that all physicians were adding on an equal number of cases adjusted by call day. The Kruskal-Wallis rank sum test was used to compare the equality of proportions.

RESULTS

A total of 721 add-on cases were reviewed (mean patient age 57.4 years (95% CI 56.2 to 58.6; 54% men). Comparatively, 736 elective cases from the same time frame were reviewed, yielding a similar mean patient age of 56 years (95% CI 55.0 to 57.0; 51% men) (Table 1). Of the reviewed add-on emergency cases, the procedure most often completed was gastroscopy (n=377 [52%]), followed by colonoscopy (n=216 [30%]), and finally, flexible sigmoidoscopy (n=105 [15%]) (Figures 1 and 2).

Add-on procedures were more likely to be gastroscopies than in the elective cases (OR 2.7; 95% CI 1.8 to 4.3; $P<0.0001$) and less likely to be colonoscopies (OR 0.24; 95%CI 0.15 to 0.38; $P<0.0001$).

The day of the week varied in the frequency of add-on cases. Monday proved to be the busiest day for cases being added to the normal slate (OR 1.7; 95% CI 1.0 to 2.28; $P=0.03$). Conversely, Fridays revealed significantly fewer add-on procedures (OR 0.31; OR 0.16 to 0.57; $P=0.0001$).

Variation was also noted with respect to time of the year, and more specifically, by month. Statistically, September was the least busiest month (40 cases) of the year for add-on procedures (OR 0.31 95% CI 0.11 to 0.78; $P=0.0006$) in the time frame studied, while the month of March had a total of 109 additional patients added.

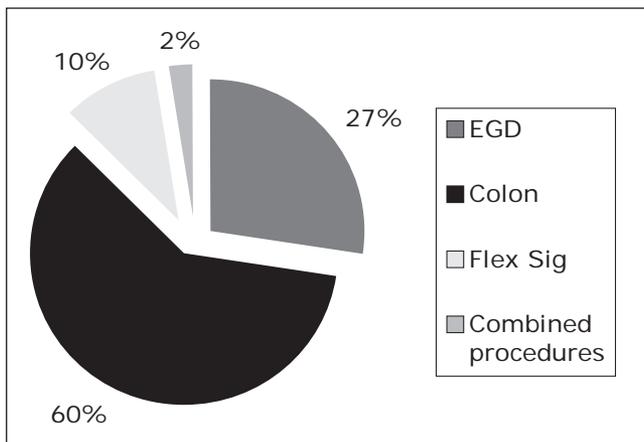


Figure 1) Breakdown of procedure types completed as elective cases. Within the electively completed cases, colonoscopies (Colon, n=442 [60%]) were most often completed followed by esophagoduodenoscopy (EGD, n=202 [27%]), flexible sigmoidoscopy (Flex sig, n=74 [10%]) and combined procedures (n=18 [2%])

Finally, the number of cases added on among eight physicians over their call period was compared. Statistically, the number of add-on cases for all eight physicians was not equal (χ^2 using H statistic for ties = 18.324 with seven degrees of freedom; P=0.0106).

DISCUSSION

Within the current working framework of the GI clinic at St Paul's Hospital, only absolute emergent cases are completed on weekends, leaving additional cases (which are still emergent) that arise over the weekend to be completed the following week. This practice may not be ideal and may increase the length of hospital stay (thereby increasing costs allocated to that individual patient) (8,12). However, this is common practice in many Canadian centres. Nonetheless, cases from Saturday and Sunday often will be stabilized with intravenous fluid resuscitation and endoscopically evaluated on Monday. Although the number of add-on cases were similar for Monday, Tuesday and Wednesday, when long weekends are accounted for (cases are added on Tuesday instead of Monday and add these cases to the usual first working day of the week), Monday tended to have more add-on cases than any other day. Interestingly, the early part of the week was heavy with add-on cases; consequently, Fridays were noted to have the fewest number of add-on procedures. Because upper gastrointestinal bleeding is the most common urgent condition, esophagoduodenoscopy was performed most often for these add-on procedures. Conversely, 60% of the elective cases (n=442) were colonoscopies. This highlights the fact that these procedures were used primarily for investigation of colonic abnormalities and/or pre-emptive screening procedures for cancer, which has become common for outpatients.

The reason for Fridays having fewer add-on cases is open to speculation. Possibly, a change of the physician on call that day may result in most cases being completed earlier in the week. The physician finishing his call schedule on Friday at 08:00 likely makes special effort on the days before to complete

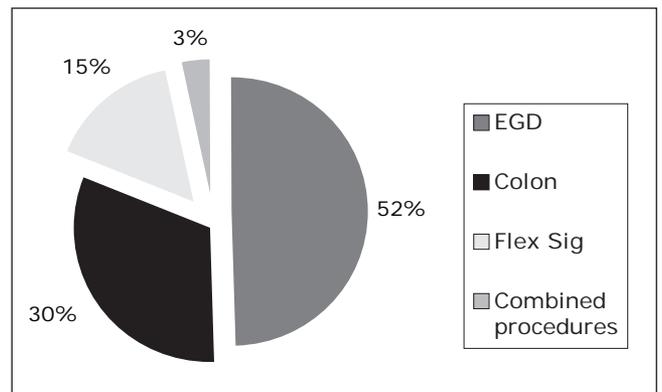


Figure 2) Breakdown of procedure types completed as add-on cases. Colonoscopy (Colon [30%]); Esophagoduodenoscopy (EGD [52%]); Flexible sigmoidoscopy (Flex Sig [15%]); Combined procedures 3%

his/her cases and thereby adds more cases to the previous days to avoid excessive 'handover' of cases. Furthermore, investigation of this factor revealed one 'outlier' with respect to the frequency of add-on cases, which may be due to a number of reasons. However, this only highlights the many possible factors that influence the number of add-on cases in a GI clinic.

Because St Paul's Hospital is a teaching hospital, residents and GI fellows are involved in virtually all consultations. At times, this may affect the numbers of cases seen each week because some advanced trainees may be more adept at 'steering' cases away (ie, outpatient appointments). Alternatively, they may aggressively advocate for endoscopic assessment and, thus, increase the number of endoscopic procedures. This is clearly a confounder that could account for some week to week variation that was not accounted for in the present study. Because a GI fellow is present all year, assessing their tendencies toward or against aggressive endoscopy practices is difficult.

Seasonal changes relative to which months are the busiest for add-on cases revealed September as the least busiest month. Multiple hypotheses may begin to explain this anomaly. However, patients returning to work or school may prevent them from seeking medical attention for a given gastrointestinal ailment until after their lives settle down (eg, October). It is possible that this hypothesis fits because there was an increase in add-on procedures slated in October.

A limitation of the present study is the fact that the entire year was not assessed and therefore there were several months that were not evaluated. This was a logistical issue because access to data regarding the several absent months was not possible on the database used. Therefore, we cannot comment on each and every month and simply state that the number of emergent endoscopic assessments in each month were not equivalent in the time period studied.

There also were statistically significant differences in the number of cases added on by specific staff; despite the fact that the environment is presumably relatively stable. Although this may be partially accounted for by fluctuations in the number of in-hospital consultations and variability in gastrointestinal bleeding, the fact that at least six weeks of call was reviewed for each staff member over a time period of one year would usually have normalized this variation. There are likely different

thresholds for endoscopic assessment among different physicians that lead to some of this variability.

It is clear that there is significant variation in add-on cases, even within a relatively stable environment. The call schedule, the specific physician on call, the day of the week and the month all appeared to result in considerable fluctuation in the number of cases added to the endoscopy slate. Further study of these factors and institution-specific evaluation is required to ensure adequate resource planning and ideal care for these patients to maximize positive outcomes.

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