

Impact of Ramadan on upper gastrointestinal endoscopy referrals in Brunei Darussalam

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ABSTRACT

Introduction: Fasting during the month of Ramadan is one of the five holy pillars in the Islamic faith and is an obligation for all its followers. Prolonged fasting may precipitate or exacerbate gastrointestinal (GI) complaints. This study assessed the impact of Ramadan on referrals for upper GI endoscopy in a tertiary referral centre.

Methods: 1,661 patients referred to the centre a month before, during and a month after the month of Ramadan over a four-year period (2004–07) were retrospectively studied. Significant endoscopic findings were taken as any bleeding lesions, severe or complicated oesophagitis, peptic ulcer disease, portal hypertension related pathologies and malignancies.

Results: Overall, there was significantly less workload generated during the fasting month (397 patients, 5.7 +/- 2.7 cases per list) compared to before (603 patients, 6.9 +/- 3.0 cases per list, p-value is equal to 0.036) and after (661 patients, 7.8 +/- 3.4 cases per list, p-value is less than 0.001) the fasting month. There was no significant difference between the period before and after the fasting month (p-value equal to 0.124). There were no significant differences in the mean age and gender of the patients. During the fasting month, there were differences in the ethnicity (fewer Malays and more Chinese, p-value is equal to 0.002) and referral sources (more wards and fewer clinics, p-value is less than 0.001). There were no differences in the referral indications, oesophageal and gastric findings, but there was a significant difference in the duodenal findings (p-value is equal to 0.001), especially ulcer disease, during the fasting month.

Conclusion: This study showed that significantly less workload was generated during the fasting month of Ramadan compared to the non-fasting

months. There were also some differences in the referral sources, ethnicity and the endoscopic findings.

Keywords: endoscopy referrals, fasting, gastrointestinal bleeding, Ramadan

Singapore Med J 2009;50(6):619-623

INTRODUCTION

Fasting during the month of Ramadan is one of the five holy pillars in the Islamic faith and is an important annual ritual practised by all Muslims. This involves fasting from dawn to dusk, followed by a break of fast at designated times. The length of fasting varies from ten to 19 hours, depending on the season in which the fasting month of Ramadan falls and the geographical locations. In countries located near the equator, the length of fasting is generally around 12–14 hours. Prolonged fasting during Ramadan has been shown to affect body metabolism and human behaviour.⁽¹⁻⁵⁾ In addition to changes in eating and sleep schedules, medications schedules also have to be changed and this can affect the control of medical conditions.^(6,7)

Gastrointestinal (GI) disorders can be precipitated or exacerbated by prolonged fasting. To date, there have only been few studies looking at the impact of Ramadan on GI disorders and these have shown different results.⁽⁸⁻¹⁰⁾ Brunei Darussalam is a developing nation with an estimated population of 385,000 (estimated population in 2006) consisting of 70% Muslims, 12% Chinese, 5% Indigenous, and 13% Others. Hence, every year there is a large proportion of the population who will be performing this important ritual. During the fasting month, the working schedule also changes from the routine 7.45 am to 12.15 pm, lunch break and 1.30 to 4.30 pm, to 8.00 am to 2.00 pm without lunch break. Despite the slightly shorter working hours, the time allocated for the endoscopic lists remained almost the same. Due to the shorter working hours during Ramadan, it can be perceived that the workload should be lighter, and the spectrum and severities of disorders encountered should be different from the non-fasting months. Therefore, this study aimed to assess the impact of the month of Ramadan on patients' referrals for upper

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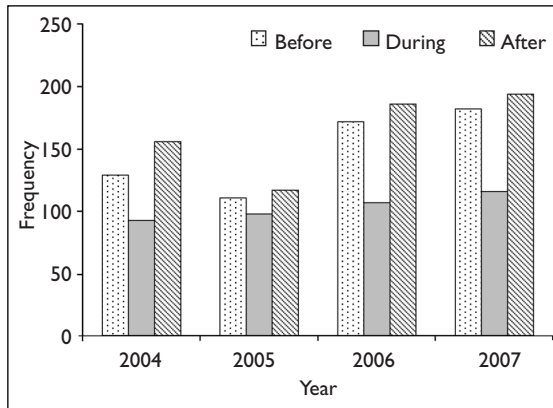


Fig. 1 Bar chart shows the number of procedures done before, during and after Ramadan during the study period.

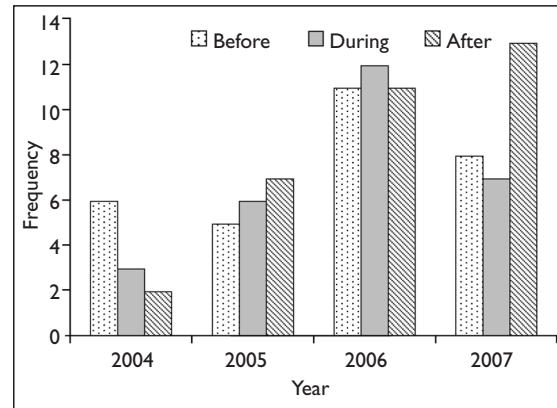


Fig. 2 Bar chart shows the number of complicated cases encountered before, during and after Ramadan during the study period.

GI endoscopy, as well as the endoscopic finding from a tertiary referral centre in Brunei Darussalam.

METHODS

The Endoscopy Unit under the Division of Gastroenterology and Hepatology, Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital is the major referral centre for the whole of Brunei Darussalam. RIPAS Hospital is a 550-bedded centre that covers all specialties. The population catchment is approximately 320,000. In our centre, the Endoscopy Unit provides an open access referral for all upper GI procedures to all the various departments, wards and outpatients clinics. All routine procedures are scheduled in the weekday mornings and emergency procedures can be arranged when required. All admissions for suspected or confirmed GI bleeding, especially upper GI, are admitted to the medical wards under the care of the Division of Gastroenterology and Hepatology. Patients are referred to the Surgical Department if the bleeding is not controlled with medical and endoscopic therapies, and are referred to the intensive care units when required.

All patients referred for upper GI endoscopy one month before, during and after the month of Ramadan from four consecutive years (2004–2007) were retrospectively studied. Over the four-year period, there were a total of 90, 75 and 85 working days for the month before, during and after Ramadan, respectively. Demographical data (age, gender, ethnic background, comorbidities), sources of referral and referral indications were collected. Details of endoscopic findings were collected and were categorised into normal and abnormal findings. Abnormal findings were further categorised into significant and non-significant. The Los Angeles Classification for endoscopic oesophagitis was used to grade the severity of oesophagitis (grades A–D).⁽¹¹⁾ Significant endoscopic findings were taken as any ulcerations, bleedings, severe oesophagitis

(grade C/D), malignancies and sequelae of significant pathologies (portal hypertension and peptic ulcer disease). Non-significant endoscopic findings were defined as normal examinations, gastritis, erosions, duodenitis, mild oesophagitis (grade A/B) and non-adenomatous polyps. Patients with complicated endoscopic lesions were defined as those with lesions (i.e. bleeding lesions such as ulcers and varices) requiring therapies such as adrenaline injection, heater probe coagulation and rubber band ligation. Data was coded and entered into the Statistical Package for Social Sciences version 10.0 (SPSS, Chicago, IL, USA) for analysis. The χ^2 test was used to compare categorical parameters where appropriate. The ANOVA was used to compare the differences in the continuous parameters. Level of significance was considered when $p < 0.05$.

RESULTS

During these three-month periods, there were 1,661 patients referred for upper GI endoscopy: before ($n = 603$), during ($n = 397$) and after ($n = 661$) the month of Ramadan. There was an increasing trend in the number of patients referred for endoscopy over the four-year period (Fig. 1). Overall, there was significantly less workload generated during the fasting month compared to the non-fasting months; respectively, 5.7 ± 2.7 cases per list, compared to 6.9 ± 3.0 cases per list, $p = 0.036$ (before) and 7.8 ± 3.4 cases per list, $p < 0.001$ (after). There was no significant difference between the periods before and after the fasting month ($p = 0.124$). There were no significant differences between the ages and the genders of the patients between these three periods. However, there were fewer Malay patients and more patients from the other ethnicities referred during the fasting months. There were also more wards referrals and less clinics (outpatient and gastroenterology clinics) referrals (Table I).

Table I. Comparisons between the demographics and the source of referrals.

| | Before Ramadan (n = 603) | During Ramadan (n = 397) | After Ramadan (n = 661) | p-value |
|---|-----------------------------|-----------------------------|----------------------------|---------|
| Mean age \pm standard deviation (years) | 49.1 \pm 16.8 | 49.7 \pm 18.0 | 48.1 \pm 16.1 | 0.317* |
| Gender | | | | |
| Male | 306 (50.7) | 205 (51.6) | 343 (51.9) | 0.916 |
| Female | 297 (49.3) | 192 (48.4) | 318 (48.1) | |
| Ethnic groups | | | | |
| Malay | 473 (78.4) | 279 (70.3) | 512 (77.5) | 0.002 |
| Chinese | 68 (11.3) | 71 (17.9) | 82 (12.4) | |
| Indigenous | 24 (4.0) | 7 (1.8) | 15 (2.3) | |
| Others | 38 (6.3) | 40 (10.1) | 52 (7.9) | |
| Source of referral | | | | |
| Wards | 161 (26.7) | 156 (39.3) | 235 (35.6) | < 0.001 |
| Outpatients | 140 (23.2) | 67 (16.9) | 127 (19.2) | |
| Gastroenterology clinics | 173 (28.7) | 84 (21.2) | 180 (27.2) | |
| Others | 129 (21.4) | 90 (22.7) | 119 (18.0) | |

*ANOVA

Data is expressed as no. (%) of patients, unless otherwise specified.

There were no significant differences with regard to the referral indications between the three periods. However, there was slightly more patients with GI bleeding referred during the fasting months, but this was not statistically significant. Dyspepsia remained the most common indication for referral. Similarly, there were no significant differences in the endoscopic findings in the oesophagus and stomach. However, there was a significant difference in the duodenal findings, especially duodenal ulcers and overall significant duodenal findings. The most common significant findings consisted of severe oesophagitis, oesophageal varices, active gastric ulcers, gastric portal hypertension-related pathologies and gastric cancer. In the duodenum, the significant findings encountered consisted mainly of ulcer diseases (Table II). There was an increasing trend in the numbers of complicated cases (defined as any lesions requiring endoscopic therapies) encountered between the fasting and non-fasting months over the four-year period. However, there were no specific trends seen among these lesions encountered between the fasting and non-fasting months. These lesions encountered consisted mainly of ulcers and varices (Fig. 2).

DISCUSSION

This study generally showed that there were some differences encountered by the Endoscopy Unit between the fasting and non-fasting months. Overall, there were fewer referrals during the fasting month of Ramadan resulting in a significantly lower workload generated. There were also significant differences in the referral sources. There were fewer referrals from the gastroenterology and other outpatient clinics, but more ward referrals during the fasting month. This could be explained by several reasons.

Firstly, most referrals from the clinics were non-urgent and might have been deferred until after the fasting month. Similarly, patients themselves may defer endoscopy until after the fasting month. Having an endoscopy during the fasting month means a disruption of the fasting routine. This is supported by the findings of a higher number of patients referred for endoscopy after the fasting month. Secondly, the act of fasting itself might have benefited some patients, especially those with post-prandial dyspepsia. Hence, a process of self-selection was taking place. The spiritual faith is believed to be stronger during the fasting month and mild symptoms and even severe symptoms may be overcome. Data from the medical record office of the hospital has also consistently showed fewer hospital admissions during the fasting months compared to the other months.

The patients' demographical data and referral indications during the fasting and the non-fasting months were comparable except for slight differences. Generally, there were no differences in the mean age and gender of the patients during the three periods. There were more patients referred with GI bleed during and after the fasting month but numbers were not statistically significant. Prolonged fasting can lead to increased upper GI pathologies, such as peptic ulcer disease. Similarly, after a month of fasting, patients may continue to develop ulcers and present after the fasting month. Not unexpectedly, there were ethnic differences encountered, with more patients from the Chinese, Indigenous and Others referred during the fasting month. This correlated with fewer Malays referred during the fasting month, as Malay patients may have deferred endoscopy until after Ramadan.

With regard to the endoscopic findings, there were

Table II. Comparisons between the indications for endoscopy and the findings.

| | Before Ramadan (n = 603) | During Ramadan (n = 397) | After Ramadan (n = 661) | p-value |
|---------------------------------------|-----------------------------|-----------------------------|----------------------------|---------|
| Indications | | | | |
| Dyspepsia | 281 (46.6) | 167 (42.1) | 281 (42.5) | 0.153 |
| Anaemia | 84 (13.9) | 55 (13.9) | 77 (11.6) | |
| Gastrointestinal bleed | 66 (10.9) | 66 (16.6) | 89 (13.5) | |
| Gastro-oesophagus reflux disease | 40 (6.6) | 28 (7.1) | 56 (8.5) | |
| Others | 132 (21.9) | 81 (20.4) | 158 (23.9) | |
| Findings | | | | |
| Oesophagus | | | | |
| Normal | 460 (76.3) | 299 (75.3) | 473 (71.6) | 0.230 |
| Gastro-oesophagus reflux disease | 101 (16.7) | 65 (16.4) | 138 (20.9) | |
| Others | 42 (7.0) | 33 (8.3) | 50 (7.6) | |
| Significant pathologies | 40 (6.6) | 29 (7.3) | 45 (6.8) | 0.917 |
| Stomach | | | | |
| Normal | 207 (34.3) | 110 (27.7) | 209 (31.6) | 0.090 |
| Gastritis | 332 (53.4) | 231 (58.2) | 376 (56.9) | |
| Ulcer disease | 46 (7.6) | 44 (11.1) | 48 (7.3) | |
| Others | 28 (4.6) | 12 (3.0) | 28 (4.2) | |
| Significant pathologies | 55 (9.1) | 47 (11.8) | 60 (9.1) | 0.275 |
| Duodenum | | | | |
| Normal | 504 (83.6) | 291 (73.3) | 521 (78.8) | 0.001 |
| Duodenitis | 54 (9.0) | 50 (12.6) | 57 (8.6) | |
| Ulcer disease | 45 (7.5) | 56 (14.1) | 83 (12.6) | |
| Significant pathologies | 51 (8.5) | 56 (14.1) | 87 (13.2) | 0.008 |
| <i>Helicobacter pylori</i> (positive) | 145/396 (36.6) | 109/280 (38.9) | 173/417 (41.5) | 0.363 |

no differences in the oesophagus and stomach. However, there was a overall higher number of gastric ulcers and significant gastric pathologies encountered during the fasting month, but this was not statistically significant. More importantly, there were more duodenal ulcer diseases encountered during the fasting month. Similarly, there was a higher number of duodenal ulcer diseases encountered after the fasting month. There was also an increasing trend in the number of complicated cases of any endoscopic lesions requiring endoscopic therapies over the study period. These consisted mainly of bleeding lesions. This increase correlated with the increase in the number of patients referred for endoscopy. However, there was no specific trend seen between the fasting and non-fasting months.

A Turkish study showed that peptic ulcer disease was more common during the fasting month, and complications such as haemorrhage and perforations were particularly common among female patients.⁽⁹⁾ In contrast, a study based on an Arab population showed that the frequency of peptic ulcer disease was less during the fasting month and more in the month following the fasting month; however, these did not reach statistical significance.⁽¹⁰⁾ They also showed that perforated ulcer diseases were more common after the fasting month. Our study showed that the overall numbers of gastric ulcer encountered were comparable but the proportions were higher, due to fewer patients

with milder indications being referred for endoscopy. Therefore, this increase may be apparent rather than real. However, there was a higher number of duodenal ulcers encountered during and after the fasting months. This is in agreement with the second study, and could be due to delayed presentation.

Apart from fasting, other factors such as age, gender and usage of medications have been shown to be important predictors of peptic ulcer disease. These may also influence the frequency and severity of the disease during the fasting month. The length of fasting, being in different geographical locations, and differences in the patients' health-seeking behaviours, may also influence the disease spectrum. Overall, prolonged fasting have been shown to affect many things including the metabolic profiles, weight, kidney function, blood pressure and diabetes mellitus control.^(1-5,12) Similarly, studies have also shown that work pattern and behaviour of patients and clinicians also change during Ramadan. However, there are also studies that have not shown any significant impact of prolonged fasting. Studies looking at the incidence of stroke and hospitalisation for asthmatic and allergic conditions and congestive cardiac failure have not shown any differences between the fasting and non-fasting months.⁽¹³⁻¹⁵⁾ However, whether our results can be generalised to other populations remains to be seen. This is because there are many ethnic, social and cultural

differences that may influence patients' behaviours and disease manifestations.

In conclusion, there were fewer referrals for upper GI endoscopy during the fasting month of Ramadan compared to the non-fasting months. There were fewer Malay patients, and more referrals were from the wards during the fasting month. More importantly, patients referred during the fasting month of Ramadan had more ulcer diseases, particularly duodenal ulcers.

ACKNOWLEDGEMENT

The author greatly appreciates the assistance provided by Ms Lim Ai Giok.

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