

## Fatal Gastrointestinal Perforations in sudden death cases in Last 10 years at UMMC- Malaysia

**Dr. OP Murty, Dr. Lye Yik Fan, Dr. Tan Ley Siang, Dr. Nurull Eddayu binti Hasbullah, Dr. Nurul Azwa binti Mohd Ismail**

**Forensic Pathology Unit, Department of Pathology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia**

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**ABSTRACT:** Gastrointestinal perforation occurs when the wall of the gastro-intestinal tract like stomach, small intestine or large bowel develops a hole through its entire thickness. This retrospective study was aimed to identify pattern of GIT perforations that caused sudden deaths in this part of the world. The study was conducted in Forensic Pathology unit of University Malaya, Kuala Lumpur in the year 2006 by reviewing the autopsy reports. There were 61 cases of GIT perforation out of 5579 autopsies conducted during a period of ten years (1996-2005). The incidence rate of fatal gastrointestinal perforation was 1.09% during this period. Out of these 61 cases, there were 49 males (80.3%) and 12 female (19.7%). The most common site of gastrointestinal perforation was at the stomach (45.7%), followed by duodenum (18.5%), esophagus (9.9%), small intestine (9.9%), and large intestine (16.0%). The 36.07% cases had positive correlation with at least one of the known risk factors.

**KEY WORDS:** Gastrointestinal perforation, peptic ulcer perforation, peritonitis, sudden deaths, silent perforations in sudden death, autopsy.

### **INTRODUCTION:**

Gastrointestinal perforation is one of the major complications that may result in sudden death. Perforation of the intestine leads to leakage of intestinal contents into the abdominal cavity causing peritonitis.

Perforation can occur anywhere in the gastrointestinal tract like esophagus, stomach, duodenum, jejunum, small intestine, large intestine, sigmoid colon and rectum. The common site is duodenum where is called peptic ulcer<sup>1</sup>.

Gastrointestinal perforation can be caused by chronic inflammation due to Helicobacter pylori, NSAIDs like aspirin, stress, and life style factors like excessive smoking, alcohol, tea or coffee consumption. It can also caused by a variety of illnesses, including appendicitis, diverticulitis, ulcer disease, Crohn's disease, and less commonly, infections of the bowel, such as infectious colitis<sup>1,2</sup>.

Symptoms of a gastrointestinal ulceration can be abdominal pain, hematemesis, melena, weight loss. Rarely, an ulcer can lead to a gastric or duodenal perforation. Complications includes bleeding, infection, and formation of intra-abdominal abscesses<sup>1</sup>.

### **MATERIAL AND METHOD:**

The autopsy reports of a period 10 years from January 1, 1996 to December 31, 2005 available in the Forensic Unit of the Department of Pathology, Faculty of Medicine University Malaya, Kuala Lumpur were scrutinized in respect of age, sex, dietary habits, ethnic groups, site of perforation, time of perforation, presenting symptoms and relation between perforation and death. The risk factors that could contribute to the formation of ulcers and later perforation of the gastrointestinal tract such as smoking cigarettes, consumption of foods and beverages containing caffeine, alcohol abuse, and physical stress were also studied.

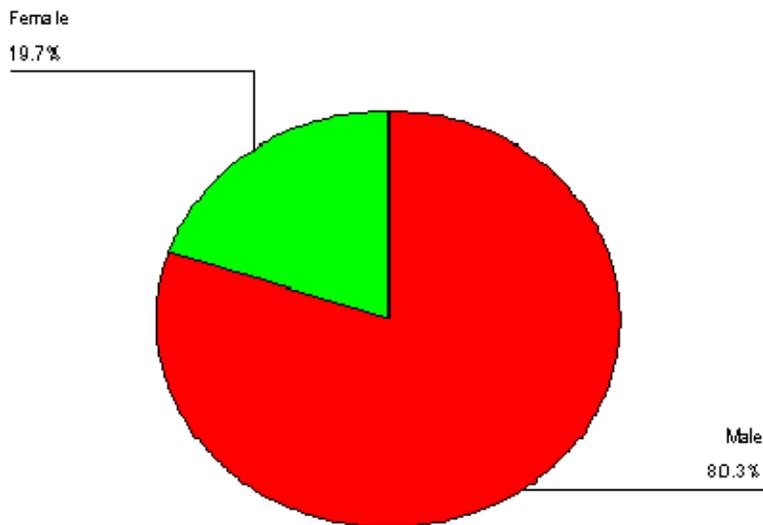
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**Corresponding Address:** Dr. O.P.Murty, Associate Professor and Head, Forensic Pathology Unit, University of Malaya, 59100 Kuala Lumpur, Malaysia, Email: dropmurty@yahoo.co.in

**RESULTS:**

Out of 61 cases subjected to post mortem examination following sudden death due to gastrointestinal perforation at this hospital over a period of ten years, there were 49 males (80.3%) and 12 female (19.7%), giving a male to female ratio of 4.076:1 [Figure 1]. According to ethnicity, over ten years, incidence of gastrointestinal perforation predominantly occurred in Chinese with 27 cases (44.3%), followed by Indian with 18 cases (29.5%), Malays with 5 cases (8.2%) and other races with 11 cases (18%) [Figure 2]. The frequency in 2005 which was 11 cases (18%) was the highest over the ten years. We conclude that the frequency of death that related with gastrointestinal perforation was on increase throughout the 10 years except for 1999, 2002 and 2004. The lowest frequency was 3 cases. It was in 1996, 1997 and 1999 and this is 4.9% of the whole cases [Figure 3]. In terms of ethnic groups, Malay showed the highest incidence in 2002 with 2 cases; Chinese, in 2005 with 6 cases; Indian, in 2005 with 5 cases; and others with 4 cases in 2001. The average age of the deceased was 43.99 years old (range 5 months – 82 years), with an almost equal age of occurrence for males (43.37 years) and females (43 years). The average age group of the deceased was 41 to 50 years old. The highest incidence occurred in 31-40 years old category

and the > 60 years old category, which comprised of 23% each. . The lowest incidence occurred in 11-20 years old category, which comprised of 1.7% only [Figure 4]. In our study, majority of the perforation cases occurred as single perforation was (67.2%). There were 32.8% of multiple perforations. The most common site for gastrointestinal perforation was at the stomach (45.7%), followed by duodenum (18.5%), large intestine (16.0%), esophagus (9.9%), and small intestine (9.9%) [Figure 5]. In our study, 23.8% of the deceased were asymptomatic but there was some limitations of the detail as some autopsy reports had incomplete histories. Abdominal pain was the most common symptom complained by the deceased (23.8%), followed by hematemesis (14.3%) and vomiting (14.3%) [Figure 6]. 34 of the deceased had peritonitis, which was 55.74%. Peritonitis is probably a complication of gastrointestinal perforation. 13 of the deceased were alcohol consumers, which was 21.31%. 7 deceased were smokers, which was 11.48%. One deceased was a tea/ coffee consumer, which was 1.64%. One deceased was taking aspirin, which was 1.64%. A total of 36.07% deceased was associated with at least one risk factor. The incident rate of fatal gastrointestinal perforation in autopsy cases in last 10 years at this hospital was 1.09%.



**Figure 1: M: F Ratio following fatal GI perforations 4.076: 1**

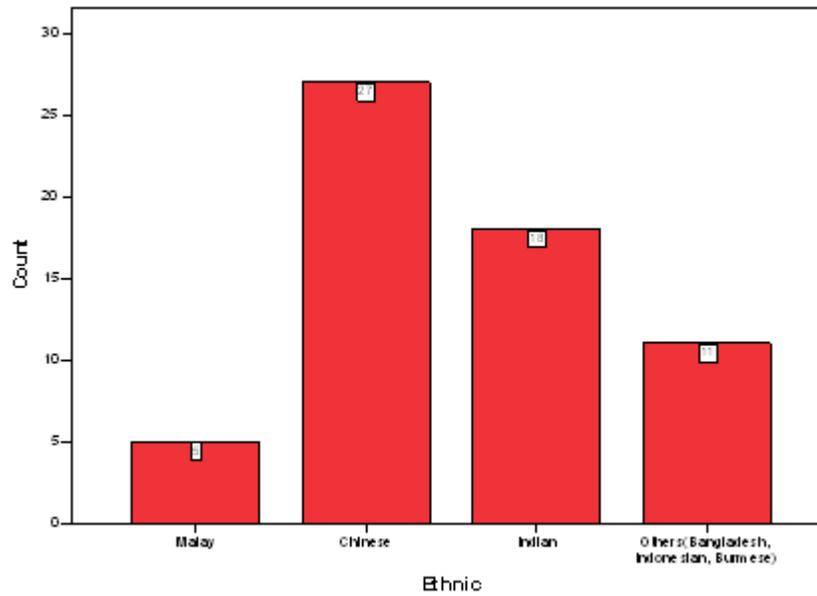


Figure 2: Frequency of cases according to ethnicity

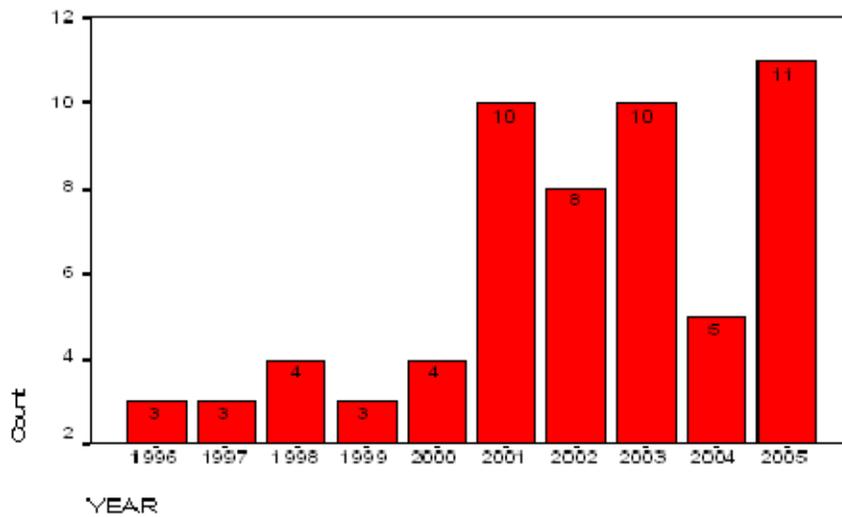


Figure 3: Frequencies of cases from 1996 to 2005

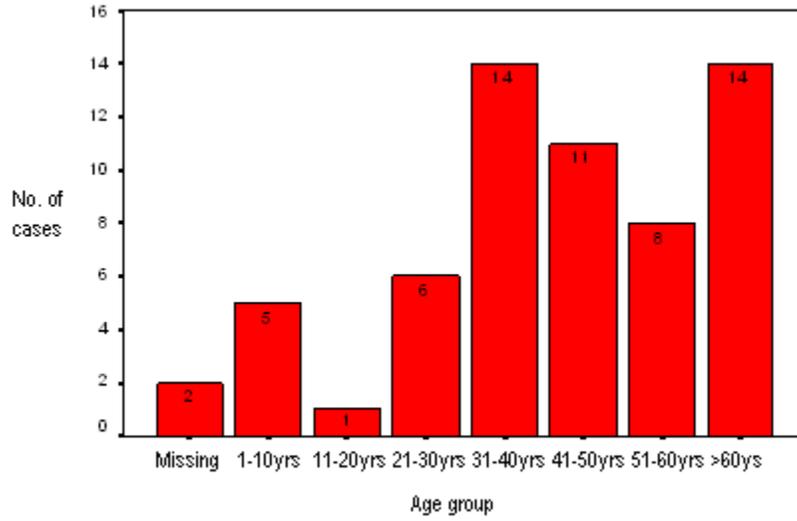


Figure 4: Number of cases according to age in decades

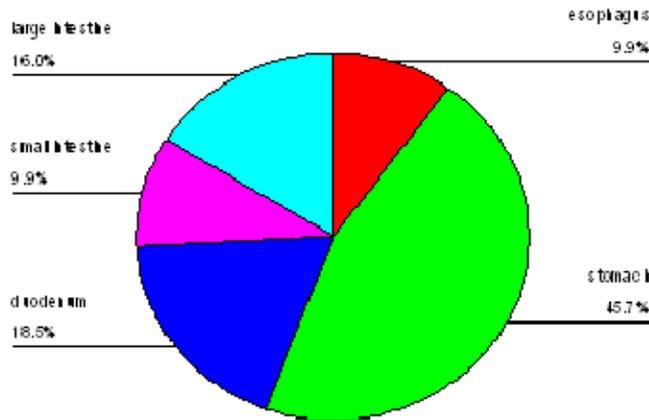
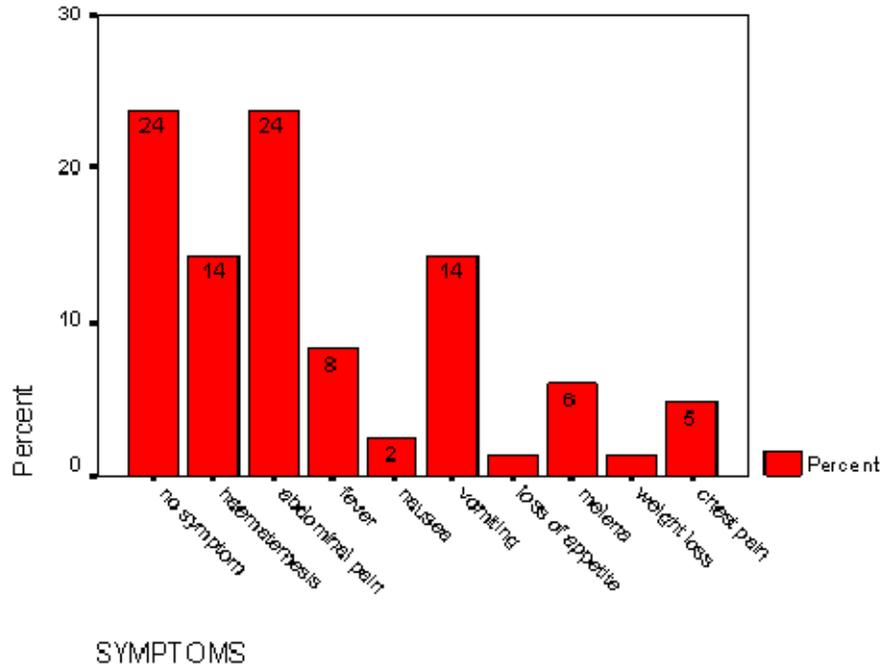


Figure 5: Site of gastrointestinal perforation



**Figure 6: Frequencies of symptoms presented by deceased**

**DISCUSSION:**

From the result, we conclude that gastrointestinal perforations occur more frequently among men than women. This is believed to be due to the lifestyles and also the risk factors that could contribute to the formation of ulcers and later perforation of the gastrointestinal tract. These factors included cigarette smoking, consumption of foods and beverages containing caffeine, alcohol abuse, and physical stress. Men are more prone to these effects, as for example they smoke rather than women. This can explain why the sex ratio is 4.076:1. From the literature review, male incidence is slightly higher than female which is in duodenal ulcer the ratio between men and women is 2:1 while in gastric ulcer the ratio is 1:1. The ratio in gastric ulcer is the same due to predominant use of NSAIDs in women<sup>3</sup>.

Based on the differences of frequencies of cases compared with ethnic groups, we conclude that there is a relationship with death due to gastrointestinal perforation and ethnic groups. One of the factors probably is lifestyle. For example in terms of drinks, Muslim mostly Malay, do not take alcohol which is one of the risk factors in getting perforation, compared to Chinese and Indian, who consume alcohol. From literature review, no specific relationship between ethnic groups and the occurrence of duodenal ulcer exists in United States<sup>4</sup>. In

Malaysia, there are various multi ethnic groups and this hospital area has 55% population of Chinese, and thus comparison with other countries may not be relevant.

Predominant age for duodenal ulcer was 25-75 years old, and it was not seen before the age of 15. For gastric ulcer, the peak incidence occurred at age of 55-65 years old and it was rare below the age of 40. Overall peak incidence of gastrointestinal ulcer was found over the age of 60 year<sup>3</sup>. In our study, the highest incidence happened in 31-40 year old category and the > 60 years old category, which comprised of 23% each. Thus, the highest category (> 60 years old) of our study is similar to other reviews. As for 31-40 year old age group, we found out that 42.86% of them had at least one risk factor, i.e. tobacco, alcohol, aspirin intake or tea/coffee consumption.

Duodenal ulcer is 4 times more common than gastric ulcer. For gastric ulcer, the lesser curvature of the stomach is the most likely site. Less than 5 % of ulcers lead to perforation. Duodenal ulcers perforate more commonly than gastric ulcers, usually into peritoneal cavity<sup>5</sup>. In our study, the most common site for gastrointestinal perforation was at the stomach (45.7%), followed by duodenum (18.5%), large intestine (16.0%), esophagus (9.9%), and small intestine (9.9%). Our result is different from

other studies for which we did not have any reasonable explanation.

The risk factors that can contribute to the formation of ulcers and later perforation of the gastrointestinal tract include cigarettes smoking, foods and consumption of beverages containing caffeine, alcohol abuse, and physical stress. In our study, there were 36.07% deaths which were associated with at least one risk factor. 23.8% did not give symptom prior to death, probably these were silent perforations.

#### CONCLUSION:

This is a retrospective study conducted by reviewing autopsy reports of 10 years period (1996-2005). During that period there were 61 cases of gastrointestinal perforation. The conclusions from this study are as follows:

- The incident rate of fatal gastrointestinal perforation was 1.09%.
- Male was the predominant sex for gastrointestinal perforation, with M: F ratio 4:1.
- Chinese with 27 cases (44.3%) was the highest ethnic group affected, followed by Indians with 18 cases (29.5%), Malays with 5 cases (8.2%) and other races with 11 cases (18%).
- The frequency in 2005 which had 11 cases (18%) was the highest during the ten years.
- The average age group of the deceased was 41 to 50 years old. The highest incidence happened in 31-40 years old category and the > 60 year old category, which comprised 23% each.

- Majority of the perforation occurred as single perforation that was 67.2%. There were 32.8% of multiple perforations.
- The most common site for gastrointestinal perforation was at the stomach (45.7%), followed by duodenum (18.5%), esophagus (9.9%), small intestine (9.9%), and large intestine (16.0%).
- Abdominal pain was the most common symptom presented by the deceased and that was seen in 23.8%.
- The 36.07% cases had positive correlation with one of the known risk factors.
- Silent perforation was present in 23.8% in total perforations observed here.

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