

Factors affecting morbidity and mortality of perforated duodenal ulcer

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ABSTRACT

Background: Duodenal ulcer is a particular type of peptic ulcer disease that afflicts the lining of the duodenum. The indications for surgery in duodenal ulcers are bleeding, perforation, obstruction, and intractability or non-healing. Today, most patients undergoing operation for duodenal ulcer disease have simple over-sewing of bleeding ulcer, or simple patch of perforated ulcer. Simultaneous performance of vagotomy either truncal or highly selective is increasingly uncommon, because of reliance on postoperative proton-pump inhibitor to decrease acid secretion and eradication therapy for helicobacter pylori infection. **Aim of the study:** To assess the factors that lead to increase the rate of morbidity and mortality in patients with perforated duodenal ulcer in different age groups and to know the effect of time lapsed between onset of symptoms and surgery. **Patients and methods:** This is a prospective study that include (100) patients who underwent emergency laparotomy for perforated duodenal ulcer during a period from May 2008 to January 2011. The operations were done in Al-Sadder Teaching Hospital and Al-Basrah General Hospital. The clinical finding, general risk factors, co-morbid medical diseases, operative finding, and postoperative complications were all taken in consideration. Follow up period range from 2 weeks to 18 months. **Results:** A hundred cases were included in this study, (96%) male and (4%) female with mean age of 43.13 years (range from 10 to more than 70) years. Fifty five percent of patients gave previous history of duodenal ulcer and (45%) had no previous history of duodenal ulcer. The most common risk factors are smoking (32%) and NSAIDs (25%). In this study most of elderly patients presented with medical diseases as hypertension, diabetes mellitus, ischemic heart disease, and chronic obstructive pulmonary disease. Most patients admitted to hospital between 19-24 hours 21%, 8% admitted during 6 hours, and 2% admitted after 120 hours. Mortality rate occur in 2%. **Conclusion:** The most common factor that leading to development of postoperative complications is delayed in hospital admission, so, to improve the results of treatment of perforated duodenal ulcer, the diagnosis and treatment should not be delayed and the associated medical illness should be treated.

Introduction:

Peptic ulcers are focal defects in the gastric or duodenal mucosa that extend into the sub-mucosa or deeper.⁽¹⁾ They may be acute or chronic, and ultimately, are caused by an imbalance between mucosal defenses and acid/peptic injury. Peptic ulcer disease is one of the most common gastrointestinal disorders in the United States with prevalence of about 2%, and a lifetime cumulative prevalence of about 10%, peaking around age 70 years. Gastric ulcer has a higher mortality than duodenal ulcer because of its increased prevalence in the elderly. Recent studies have shown an increase in the rates of hospitalizations and mortality in elderly patients for the peptic ulcer complications of bleeding and perforation. Presumably, this is due to the increasingly common use of non-steroidal anti-inflammatory drugs in this elderly cohort, many of whom also have Helicobacter pylori infection.⁽²⁾ The association of various probable risk factors such as

(smoking, NSAIDs, steroids, alcohol, inadequate dietary intake) with duodenal ulcer perforation have been studied widely, although the effect of stress and fasting in establishment of duodenal ulcer and the development of its perforation must not be ignored.⁽³⁾ The most common causes of peptic ulcer disease are:-

1. Helicobacter pylori infection

2. Nonsteroidal anti-inflammatory drugs (NSAIDs)

3. Smoking

4. Stress

Although difficult to measure, both physiologic and psychologic stress undoubtedly play role in the development of peptic ulcer in some patients.

5. Other factors

Include Zollinger Ellison Syndrome (gastrinoma), trauma, burn, cocaine, alcohol and fasting.⁽⁴⁾

The Perforation is the second most common

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complication of peptic ulcer. Most perforated peptic ulcers are located in the first part of the duodenum (35- 65%), with (25 - 45%) located in the pylorus and (5 25%) located in the stomach.

In selected populations, non-operative management of perforated ulcer is a reasonable option. The onset of symptoms of less than 24 hours, hemodynamic stability and an absence of systemic signs of sepsis in a patient under the age of (70) years are all indications for a trial of non-operative management.⁽⁵⁾ Imaging studies, most commonly CT scan of the abdomen, but occasionally gastroduodenography with a water soluble contrast, should be performed to identify any contrast extravasations. Patients with contained perforations, and those without free contrast extravasations, are candidate for non-operative management. The increase use of CT scan has greatly improved our ability to detect perforation. Suspicious finding of CT scan include unexplained intra-peritoneal fluid, pneumoperitonium, bowel wall thickening, mesenteric fat streaking and extravasation of contrast.⁽⁶⁾ Nasogastric tube decompression, fluid resuscitation, administration of proton pump inhibitors, thromboembolic prophylaxis, and appropriate antimicrobial therapy should result in clinical improvement in patient's symptomatology within 12 hours. However, it has been clearly demonstrated that observation periods of longer than 12 hours without improvement worsen the outcomes from perforated peptic ulcers, and should be avoided. Patients with hemodynamic instability, onset of symptoms longer than 24 hours in duration, those with peritonitis on physical examination and those with systemic signs of sepsis should be surgically explored. Additionally, patients who are age 70 or greater are less likely to respond to non-operative management, and should be considered for early operative intervention.⁽⁷⁾ Failure of non-operative management, defined as increasing abdominal symptoms, fever, or worsening leukocytosis, should be considered for urgent surgical intervention. In the conditions with H-pylori therapy and acid reducing medications, up to 90% of perforations may be treated with simple closure with or without omental patch (Graham patch) procedure which is an emergency and contaminated surgery, so patients may frequently develop postoperative complications like wound infections, pneumonia, paralytic ileus, septicemia, pelvic collections, shock, renal failure, electrolyte imbalance and burst abdomen. Definitive ulcer surgery like patch closure with highly selective vagotomy, patch closure with truncal vagotomy and pyloroplasty or distal gastrectomy (billroth I, billroth II, Roux-en-Y) with or without vagotomy is no longer required in majority of patients, as recurrence rates have

dropped dramatically with post-operative medical therapy including histamine 2 receptor blockers and proton pump inhibitors.⁽⁸⁾

Aim of study: Is to assess the factors that lead to increase the rate of morbidity and mortality in patients with perforated duodenal ulcer in different age groups and to know the effect of time lapsed between onset of symptoms and surgery on development of post-operative complications.

Patients and Methods: A descriptive prospective study was based on the patients admitted in Al-Sadder Teaching Hospital and Al-Basrah General Hospital from May 2008 to January 2011. In this study (100) patients were diagnosed in casualty as duodenal ulcer perforation. The diagnosis based on history, clinical examination and plain X-ray of the chest (P/A-view) in erect posture as well as abdominal ultrasound if available. All cases had pneumoperitoneum (air under diaphragm) on plain X-rays. The age of patients in this study ranges from 10 to more than 70 years, mean age was (43.13) year. Ninety six patients were males and (4) patients were females. Regarding the place of residence, (58) patients live in the rural areas, while (42) patients live in urban areas. In this study, (55) patients gave a previous history of duodenal ulcer disease (this is proved by esophagoduodenoscopy which done previously) and (45) patients without a previous history of duodenal ulcer disease. The risk factors associated with perforated duodenal ulcer mentioned in this study includes; smoking, nonsteroidal anti-inflammatory drugs, steroids, fasting, stress, family history and alcoholism. The preadmission time varied from (6-120) hour and most patients were admitted between 19-24 hour, about (21) patients. All patients were admitted to emergency unit and kept on nil by mouth, intravenous fluid infusion, nasogastric tube with monitoring of vital signs. Broad spectrum antibiotics given intravenously in form of third generation cephalosporin and metronidazole with gastric antisecretory agents (like H₂ receptor antagonist and proton pump inhibitors) and appropriate analgesia. A laparotomy was done through upper midline incision and found that moderate to large amount of free fluid collections in the peritoneal cavity in form of serosanguineous, bilious, and purulent fluid; and 26% of cases had gross peritoneal soiling. Forty percent of perforations were adherent by omentum at time of surgery. The perforations were located at the anterior wall of first part of the duodenum and the

size of perforations were varies from less than (5 mm) in 60% of cases, (5-10 mm) in 30% of cases, and in 10% of cases the perforation size were more than (10 mm).

Adequate postoperative care was done in all cases during hospitalization and all patients were continued on intravenous fluid, antibiotics, gastric antisecretory agents, analgesia and nasogastric tube for several days. In uncomplicated patients the nasogastric tube removed after third or fourth postoperative days, oral fluid started and the patients were discharged from hospital after (6-8) days. In this study (24)

patients were developed several complications, and only two patients died out of hundred cases due to multiple organ failures and septicemia. Follow up done in all patients after 2 weeks, 1 month, 2 months, 6 months, 12 months and 18 months.

Results:

Age and sex distribution: Hundred cases were studied, 35 patients (35%) were between 30 and 40 years of age group. Age ranges from 10 years to 70 years, mean age was (43.13) years and standard deviation was (14.10) years. Ninety six patients (96%) were male while 4 patients (4%) were Female.

Table (1): Age and sex distribution in patients with perforated duodenal ulcer

| Age group (years) | Number of males | Percentage | Number of females | Percentage | Total | Percentage |
|-------------------|-----------------|------------|-------------------|------------|-------|------------|
| 10-20 | 1 | 1% | 0 | 0% | 1 | 1% |
| 21-30 | 17 | 17% | 0 | 0% | 17 | 17% |
| 31-40 | 35 | 35% | 0 | 0% | 35 | 35% |
| 41-50 | 19 | 19% | 0 | 0% | 19 | 19% |
| 51-60 | 14 | 14% | 1 | 1% | 15 | 15% |
| 61-70 | 7 | 7% | 2 | 2% | 9 | 9% |
| >70 | 3 | 3% | 1 | 1% | 4 | 4% |
| Total | 96% | 96% | 4 | 4% | 100 | 100% |

Fifty eight patients (58%) were from rural areas , while 42 patients (42%) were from urban areas.

Table (2): Place of residence

| Status | Number | Percentage |
|--------|--------|------------|
| Rural | 58 | 58% |
| Urban | 42 | 42% |
| Total | 100 | 100% |

History of duodenal ulcer disease:

In this study, 55 patients (55%) gave a previous history of duodenal ulcer and 45 patients (45%) without previous history of ulcer.

Table (3): History of duodenal ulcer disease

| History of duodenal ulcer | Number | Percentage |
|------------------------------|--------|------------|
| duodenal ulcer | 55 | 55% |
| No history of duodenal ulcer | 45 | 45% |
| Total | 100 | 100% |

Risk factors associated with perforated duodenal ulcer:

Regarding the risk factors we found 32 patients (32%) with perforated duodenal ulcer were active smokers, 25 patients (25%) gave history of NSAIDs, and 11 patients (11%) were on steroid therapy. (See table 4)

Table(4): Risk factors of perforated duodenal ulcer

| Associated risk factor | Number | Percentage |
|------------------------|--------|------------|
| Smoking | 32 | 32% |
| NSAIDs | 25 | 25% |
| Steroids | 11 | 11% |
| Fasting | 10 | 10% |
| Stress | 9 | 9% |
| Family history | 9 | 9% |

Associated medical diseases:

There are several medical diseases associated with perforated duodenal ulcers. (See table 5)

Table (5): Associated medical diseases

| Medical disease | Number of patients | Percentage |
|------------------------|--------------------|------------|
| Hypertension | 14 | 14% |
| Diabetes mellitus | 11 | 11% |
| Ischemic heart disease | 7 | 7% |
| COPD | 2 | 2% |
| Total | 34 | 34% |

The time between onset of symptoms and admission:

The time between onset of symptoms and admission varied from (6) hours to (120) hours. Nine patients (9%) came to the hospital within (6) hours of the onset of symptoms, 21 patients (21%) came between (19 -24) hours, and 2 patients (2%) came after (120) hours.

Table (6): Time between onset of symptoms and admission.

| Duration (hours) | Number | Percentage |
|------------------|--------|------------|
| 6 | 9 | 9% |
| 7-12 | 14 | 14% |
| 13-18 | 16 | 16% |
| 19-24 | 21 | 21% |
| 25-36 | 12 | 12% |
| 37-48 | 7 | 7% |
| 49-72 | 13 | 13% |
| >72 | 8 | 8% |
| Total | 100 | 100% |

Clinical features:**Table (7): Major symptoms at admission**

| Symptoms | Number | Percentage |
|-------------------------|--------|------------|
| Severe abdominal pain | 100 | 100% |
| Abdominal distention | 65 | 65% |
| manifestations of shock | 13 | 13% |

Major signs at admission:**Table(8): Major signs at admission**

| Signs | Number of patients | Percentage |
|-------------------------|--------------------|------------|
| Manifestations of shock | 13 | 13% |
| Tachycardia | 100 | 100% |
| Anemia | 30 | 30% |
| Fever | 30 | 30% |
| Dehydration | 50 | 50% |
| Abdominal distention | 65 | 65% |
| Abdominal tenderness | 100 | 100% |
| Abdominal rigidity | 100 | 100% |
| Absence of bowel sound | 75 | 75% |

Postoperative complications:

Twenty four patients in this study developed complications. The commonest complications were wound infections (20.83%), and respiratory complications (segmental collapse of the lung) (20.83%), and paralytic ileus (16.66%),

While the other complications occur less frequently. Twopatients developed two complications and another patient who came with(120) hours after the onset of symptoms developed three complications like renal failure, respiratory infection, and burst abdomen.

Table (9): Postoperative complications

| Complications | Number of patients | Percentage |
|--------------------------|--------------------|------------|
| Wound infections | 5 | 20.83 |
| Respiratory complication | 5 | 20.83 |
| Paralytic ileus | 4 | 16.66 |
| Burst abdomen | 2 | 8.33 |
| Septicemia | 2 | 8.33 |
| Pelvic collection | 2 | 8.33 |
| Intestinal obstruction | 1 | 4.16 |
| Incisional hernia | 1 | 4.16 |
| Urinary tract infection | 1 | 4.16 |
| Renal failure | 1 | 4.16 |
| Total | 24 | 100 % |

Most complications developed between 4th and 5th postoperative day and these were wound infections, chest infections and ileus. Partial intestinal obstruction developed after (3) months, while incisional hernia developed after (6) months.

Mortality:

Two patients (2%) were died on second postoperative day due to septicemic shock with multiple organ failure. The complicated patients had prolonged hospital stay as much as 28 days.

The complicated patient: Age distribution:

Most of the patients were in middle age group. Average age of the complicated patients were (46) years.

Duration before admission in complicated patients: An average (50.7) hours were lapsed outside hospital before admission, (range between 6 hours to 120 hours). Ninety six hours before admission were lapsed in patients who developed burst abdomen and paralytic ileus. Renal failure developed in a patient who lapsed (120) hours before admission.

Hospital stay of complicated patient: The average hospital stay of complicated patients was (13) days, (range from 7 to 28 days). Most prolonged stay period was found in burst abdomen (28) and patient with pelvic collection and respiratory complications had hospital stay for (13) days and (11) days respectively. **In uncomplicated patient:** An average hospital stay was (7) days, (range from 6 to 8 days), and (19) hours were lapsed outside hospital before admission.

Discussion:

Duodenal ulceration still common disease, and the most common complications of duodenal ulcer disease, in decreasing order of frequency, are bleeding, perforation, and obstruction due to modern diagnostic and effective treatment facilities of duodenal ulcer, the incidence of patients with chronic duodenal ulcer and pyloric stenosis has reduced markedly.

In contrast, incidence of perforated duodenal ulcer has not reduced at all to that extent and it is still common in surgical practice.⁽¹⁾

The age of the patients in this study is ranging from (10 to more than 70) years, mean age was (43.13) years. This was similar to that of other studies, like the results of A B M AHannan(2005)⁽⁹⁾, Barman (1990), and Paul. H. Jordan (1995).

There were 4 cases (4%) of female presented with perforated duodenal ulcer in our study while in A B M A Hannan and Rayhana Awwal studies no female affected. So in this present study the affected female may be due to increasing use of NSAIDs, steroids, and smoking. Other studies also found a male predominance like Paul. H. Jordan study showed male- female ratio 26: 1 and Barman study reported (78%) affected male patients.

The very low incidence of female patients with duodenal ulcer perforation in comparison to male incidence may be due to great difference in habits, social, economical, and cultural activities.⁽¹⁰⁾

Table 10: Comparison of socioeconomic state of our study with two different studies

| Status | Our study | Kais and Zakaria study | Zangana and Garota study |
|--------|-----------|------------------------|--------------------------|
| Urban | 42% | 42% | 61% |
| Rural | 58% | 58% | 39% |

In table (10): 58 patients (58%) with perforated duodenal ulcer live in the rural areas while 42 patients (42%) live in urban areas and this difference may be explained due to alterations in occupations, educational status, and alterations in life style, and these results were similar to that reported by Kais and Zakaria study (2005)⁽³⁾, while Zangana and Garota study (2004)⁽¹¹⁾, were found patients residing in the rural areas had a lower incidence of perforations (39%) than that living in the urban areas (61%).

About 55 patients (55%) gave previous history of duodenal ulcer (this depending on esophagoduodenoscopy which done previously) and 45 patients (45%) without history of duodenal ulcer. This is similar to other studies such as ABMAHannan in which 60 patients (60%) have history of duodenal ulcer, and Paul. H. Jordan reported 67 patients (67%) had previous history of duodenal ulcer.

Table 11: Comparison of risk factors between our study and other three studies

| Risk factor | Our study | Kais and Zakaria study | Kocer et al study | Zangana and Garota study |
|---------------------|-----------|------------------------|-------------------|--------------------------|
| Smoking | 32% | 69.4% | 73.2% | 65% |
| NSAIDs and steroids | 36% | 32.2% | 8.9% | |
| Fasting | 10% | 53.2% | | 53.2% |
| Stress | 9% | 75.8% | | 18% |
| Family history | 9% | 33.9% | | |
| Alcohol | 4% | 27.4% | 12.3% | |

In table (11): regarding the risk factors associated with perforated duodenal ulcer, in our study it was found that 32% (n=32) were smokers (most of them taking about 40 cigarette or more per day), 36% (n=36) were on NSAIDs and steroid, fasting patients constituted about 10% of the total number, both stress and family history had 9%, while alcoholic patients had incidence about 4%. In a study done by Kais and Zakaria on (62) patients with perforated duodenal ulcer found that the smokers constitute about 69.4% (n=43), those on NSAIDs 32.2% (n=20), fasting patients about 53.2% (n=33), those with stress about 75.8% (n=47), those with family history constitute 33.9% (n=21), and alcoholic patients about 27.4% (n=17). In Zangana and Garota study on (124) patients, the incidence of three risk factors: smoking 65% (n=80), fasting 53.2% (n=66), stress 18% (n=22).

In Kocer et al study (2004)⁽¹²⁾ on (269) patients, they reported that the incidence about 73.2% for smokers (n=197), NSAIDs and steroid was 8.9% (n=24) patients, and alcoholic patients with 12.3% (n=33) patients.

Fasting play an important role in duodenal ulcer perforation (10% in our study). This may be explained in that missing one of the important three daily meals, during fasting, with prolonged underutilization of gastric acidity, especially in smokers during the nights of Ramadan, can be increasing gastric acidity and decreasing the defensive mechanisms of gastric mucosa causing ulcer and then perforation.⁽¹³⁾ It seems that stress is a significant risk factor. This might reflect the effect of the war situation in our country, 45% of our patients were have no history of duodenal ulcer disease during the period preceding the perforation, and this explained that the stress is important factor in ulcer perforation especially those who were fasting Ramadan.⁽⁴⁾ A positive family history of first degree relatives with duodenal ulcer increases the risk to develop ulcer disease and its complications. This familial aggregations of ulcer is multifactorial; sharing psychological stress, food habits, in addition to the same genetic factors.

In this study we found some patients with perforated duodenal ulcer were associated with one or more of medical diseases like hypertension, diabetes mellitus, ischemic heart disease and chronic obstructive pulmonary disease which influence the rate of morbidity and mortality and this is supported by other studies like Kocer et al study. The duration between onset of symptoms and the admission to the hospital has a great influence on post-operative complications. It range from (6 to 120) hours; and most of patients (n=21, 21%) were admitted to the hospital between 18-24 hours. Nine patients (9%) were admitted during the first 6 hours, and 2 patients (2%) were admitted after 120 hours.

In A B M A Hannan study found that 19 patients (19%) admitted between 19-24 hours, 13 patients (13%) admitted during the first 6 hours, and 2 patients (2%) admitted after (120) hours. In this study the complicated patients lapsed (50.7) hours before admission whereas the uncomplicated patients lapsed only (19) hours. This suggests that the prolonged period before admission to hospital increases the rate of postoperative complications.

This is supported by Deus Fombellida⁽¹⁴⁾ and A B M A Hannan studies. All patients in this study presented with abdominal pain, tenderness, guarding and rigidity but the severity varied from patient to patient. Thirteen patients (13%) presented with shock during admission that were less than that of A B M A Hannan (19%) and Rayhana Awwal (30%) studies.

In this study (65%) of patients presented with abdominal distention, while in A B M A Hannan study, (67%) of patients presented with abdominal distention and in Rayhana Awwal study the abdominal distention found in all patients.

All patients in this present study had free gas shadow in plain X-ray of the chest in erect posture, although it is generally accepted that only (70%) of duodenal perforation have X-ray features of pneumoperitoneum.

Table 12: Comparison of perforation size between our study and two different studies

| Size of perforation | Our study | Kocer et al study | A B M A Hannan study | Site of perforation |
|---------------------|-----------|-------------------|----------------------|--|
| Less than 0.5 cm | 60% | 71% | 64% | All in the anterior wall of the first part of duodenum |
| 0.5 – 1 cm | 30% | 21.9% | 27% | |
| More than 1 cm | 10% | 7.1% | 9% | |

In table (12): laparotomy findings in this study were more or less;

similar to that of other studies. Found that (60%) of perforations were less than (5mm) in size, (30%) were between (5-10mm) in size and (10%) of perforations were more than (10mm) in size, also found that(26%) of cases had gross peritoneal soiling. In comparison with A B M A Hannan study, about (64%) of perforations were less than (5mm) in size, (27%) of perforations were between (5-10mm) and (9%) were more than (10mm) in size, and (23%) of cases had gross peritoneal soiling. Kocer et al study reported

That 71%, 21.9%, and 7.1% for perforation sizes <0.5, 0.5-1, and >1 cm respectively. In present study there is no clear effect of size of perforation on the rate of morbidity and mortality, because we don't

have huge perforation size. Patient who lapsed a longer time before operation had purulent peritoneal fluid in (25%) of cases; in contrast to (22%) of cases had purulent fluid in A B M A Hannan study.

In table (13): the complications in this study occur in 24 patients (24%). In A B M A Hannan study, found that (21%) of patients developed complications, while in Rayhana Awwal study (40%), and in Bonati study (30%)⁽¹⁵⁾, while in Kocer et al study, were 24.2% of patients developed complications. The mortality rate in our study was 2%, which is similar to that reported by A B M A Hannan study, and lower than rate of both Kocer and Boey et al study (8.6% and 7.8% respectively).

Table 13: Morbidity and mortality for different studies

| Complications | Present study | Kocer et al study | A B M A Hannan study | Boey et al study | Rayhana Awwal study | Bonati study |
|---------------|---------------|-------------------|----------------------|------------------|---------------------|--------------|
| Morbidity | 24% | 24.2% | 21% | | 40% | 30% |
| Mortality | 2% | 8.6% | 2% | 7.8% | | |

In table(14):found that in our study; wound infections, respiratory complications, and paralytic ileus were the most common complications (20.83%, 20.83%, and 16.66%, respectively) as in A B M A Hannan study, but with different rates (14.3%, 19%, and 14.3%, respectively). In case of Kocer et al study, respiratory complications

(37.04%) were the most common complications than in our study and in A B M A Hannan study. The of wound infections in Kocer et al study were (18.52) which are more than the rate in A B M A Hannan study and less than that present in our study.

Table 14: Comparison of complication of perforated DU between our study and two different studies.

| Complications | Our Study | | A B M A Hannan Study | | Kocer et al study | |
|--------------------------|-----------|-------|----------------------|------|-------------------|---------|
| | No. | % | No. | % | No. | % |
| Wound infections | 5 | 20.83 | 3 | 14.3 | 20 | 18.52 |
| Respiratory complication | 5 | 20.83 | 4 | 19 | 40 | 37.04 |
| Paralytic ileus | 4 | 16.66 | 3 | 14.3 | 10 | 9.25 |
| Burst abdomen | 2 | 8.33 | 2 | 9.5 | 0 | 0 |
| Septicemia | 2 | 8.33 | 2 | 9.5 | 9 | 8.34 |
| Pelvic collection | 2 | 8.33 | 4 | 19 | 2 | 1.86 |
| Intestinal obstruction | 1 | 4.16 | 0 | 0 | 0 | 0 |
| Incisional hernia | 1 | 4.16 | 0 | 0 | 0 | 0 |
| Urinary tract infection | 1 | 4.16 | 1 | 4.8 | 0 | 0 |
| Renal failure | 1 | 4.16 | 1 | 4.8 | 10 | 9.25 |
| Duodenal fistula | 0 | 0 | 1 | 4.8 | 0 | 0 |
| Total | 24 | 100 | 21 | 100 | 91 | 84.26 ? |

? In Kocer et al study (cardiac failure 7.41%, anastomotic dehiscence 5.55%, cerebral vascular disease 1.86%, gastrointestinal bleeding 0.92%).

Most postoperative complications occurred in the 4th and 5th postoperative day. One patient developed partial intestinal obstruction and treated conservatively in hospital for three days, while another one who developed incisional hernia treated surgically with hernial mesh repair. The average age of the complicated patients was (46) years. The complicated patients also lapsed more time (average 50.7 hours) before admission. Average hospital stay of complicated patients was 13 days. This result was relatively similar to A BMA Hannan study, but less than that of Mesbah study (the average hospital stay of complicated patients was 17.8 days). This short hospital stay in our study was due to lower incidence of complications. Uncomplicated patients were discharged from hospital (6-8) days after operation and average hospital stay was (7) days.⁽¹⁶⁾

Conclusion:

The most common factor that leading to development of postoperative complications is delayed in hospital admission, so; to improve the results of treatment of perforated duodenal ulcer; the diagnosis and treatment should not be delayed and the associated medical illness should be treated.

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