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Research Article

**OBSTRUCTIVE JAUNDICE: INCIDENCE, ETIOLOGY AND
MANAGEMENT IN ASEER REGION, SAUDI ARABIA**

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Abstract:

Background: Obstructive Jaundice is one of the most serious diseases of the digestive system. There are many medical conditions that induce obstructive jaundice, which include: gallstones, narrowing of bile ducts, cysts, pancreatitis, cancer head of pancreas, biliary tract tumors, liver tumors. The mechanism of obstructive jaundice is caused by a defect in the secretion of bilirubin dye of the liver across bile ducts. There are about 25,000 new cases of carcinoma of the pancreas each year, about half of which are accompanied by obstructive jaundice. This study aims to identify incidence and causes of obstructive jaundice in Aseer region. **Methodology:** A Retrospective case-series study design was used. Medical records of patients with obstructive jaundice who were admitted to the surgical department of Aseer Central Hospital were reviewed. They included all surgical cases of obstructive jaundice aged 18 years and above during the period from July, 2016 to July, 2017.

Results: There was an obvious increase of obstructive jaundice within age range of 22-35 years. The mean BMI for obstructive jaundice patients was 28.37 ± 8.33 . The majority were overweight (45.45%) and 21.93% were obese. Most patients presented with gallstones (78%). Narrowing of the bile duct, cysts and pancreatic cancer, pancreatitis, liver cancer, gallbladder cancer and mirrizi syndrome were presented in 12%, 3.5%, 1.5%, 1.0%, and 0.5% respectively. The most commonly used modalities of treatment were ERCP (51.3%) and cholecystectomy (36.9%).

Conclusion: Incidence of obstructive jaundice was estimated to be 242 cases per 1000 surgical cases. Females and adults between 22-35 years were at a higher risk of obstructive jaundice. Most of patients are presented with either gallstones or pancreatic cancer. The most common treatment interventions were ERCP and cholecystectomy which were associated with more than 90% improvement rate.

Key words: Obstructive jaundice, surgical jaundice, complications, Mirrizi syndrome, ERCP.

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INTRODUCTION:

Jaundice is a condition in which there is yellowish discoloration of skin and mucous membranes due to elevated serum bilirubin level. In obstructive jaundice, there is increase in the conjugated fraction of bilirubin. Obstructive Jaundice is one of the most serious diseases of the digestive system. It occurs due to impairment in the bile flow through the biliary ducts out to the duodenum. [1]

The principle etiologies for obstructive jaundice are gallstones, stricture of bile ducts due to fibrosis, cysts of the bile ducts, pancreatic cancer, liver tumors, pancreatitis and biliary tract tumors. [2]

There are about million new cases of cholelithiasis discovered in the united states each year, of which about 80,000 (8 %) have common bile duct stones. There are about 25,000 new cases of carcinoma of the pancreas each year, about half of which are accompanied by jaundice, and 7,000 to 8,000 new cases of bile duct tumors. Pancreatic cancer affects 8-10 patients per 100 000 population, making it the primary cause of malignant obstructive jaundice and the presenting feature in over three quarters of these patients. [3]

Patients suffering from obstructive jaundice usually present with yellow colored skin and mucous membranes, severe abdominal pain, fever, nausea, vomiting and pruritus due to retained bile salts. They also suffer from coagulopathy, sepsis and renal failure which are the major problems in the patient with obstructive jaundice [4].

Its diagnosis depends on assessment of serum bilirubin level and liver function tests.

Other investigations for detection of the cause of jaundice include tumor markers, ultrasonography which is considered a good initial screening tool, CT and MRI which have a major role in imaging biliary system, endoscopic ultrasound, cholangioscopy and intra ductal narrow band imaging. Selection of investigation for diagnosis depends on available resources, experience about advanced endoscopes, cost effectiveness and patient related contraindications. [5]

The line of treatment for obstructive jaundice depends on the cause of obstruction as following: Gallstones are treated by removal of stones using endoscope; bile duct stricture or obstruction by tumors is treated by endoscopic stent, which may be used to relieve obstruction temporarily till definitive treatment is done which include surgical removal of tumors, chemotherapy or radiotherapy. [6]

These lines of treatment have some complications such as bile duct injury, bile duct inflammation (cholangitis) and pancreatitis. [7]

This study aimed to estimate the incidence of obstructive jaundice and to identify its causes in Aseer region. In addition, the study aims to identify the common approaches used for its management. This will be achieved by studying the clinical pattern of obstructive jaundice, its causes and management in Aseer Central Hospital, Abha, Saudi Arabia.

MATERIALS AND METHODS:

This study is a retrospective Case series study, conducted in the surgical department at Aseer Central Hospital, Abha, Saudi Arabia. The study included all surgical cases of obstructive jaundice aged 18 years and above who were admitted in Aseer Central Hospital during the period from July,2016 to July,2017. This resulted in reviewing the medical records of 195 cases.

Data were collected using a structured data collection sheet. Identified patients were contacted by phone to obtain their consents

Data included patients' demographics, clinical symptoms, therapeutic intervention and long-term outcomes.

The researcher used the descriptive and analytical methods, and this was reinforced in the language of numbers and the use of statistics related to the subject under study by using Statistical Package for Social Sciences SPSS software version 18.0 in data entry and analysis. Descriptive statistics were presented as numbers and percentages for categorical data and mean and standard deviation for continuous data. Chi-square test was used for the association between categorical variables. P-value equal or less than 0.05 will considered statistically significant.

This study methods were reviewed and approved by ACH Ethics and IRB (Internal Review Board) Committee, REC# 2017 -04-16, October 23, 2017 in accordance with departmental and Aseer Central Hospital policy and that the facilities and resources specified in the protocol are adequate and available.

RESULTS:

The study results show that the total number of emergency cases admitted as surgical cases were 824 excluding trauma cases. During the study period, two hundred cases were admitted with a diagnosis of obstructive jaundice, 5 cases were excluded due to incomplete medical records or unobtained patient's consent. Therefore, a total number of 195 cases were

included in this study. The majority of included patients were females 139 (72.02%), while males

represents (59) 28% , **figure 1**.

Figure 1: Sex distribution of involved patients

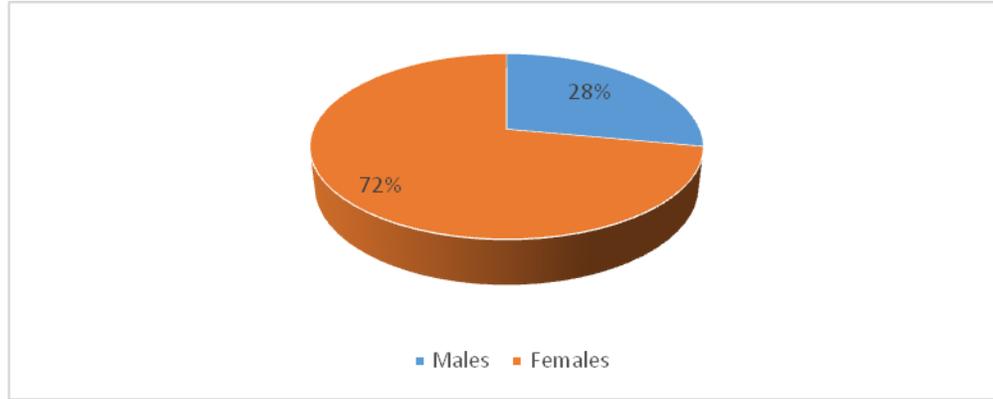


Table (1): Age distribution of involved patients:

| years | Frequency | Percent |
|---------------------------------|-------------------------|---------------|
| 18-25 | 23 | 11.9% |
| 26-32 | 52 | 26.8% |
| 33-40 | 26 | 13.4% |
| 41-50 | 37 | 19.1% |
| 51-60 | 22 | 11.3% |
| More than 60 | 34 | 17.5% |
| Total | 195 | 100.0% |
| Mean age± Std. Deviation | 43.9 ±19.48 year | |
| Median age | 39.0 year | |

According to age distribution of patients, results presented in **table 1** shows that the age range was within 18-109 (43.89±19.48) years. It shows that about half of patients were aged more than 40 years, while the most common age group was 26-32 years old.

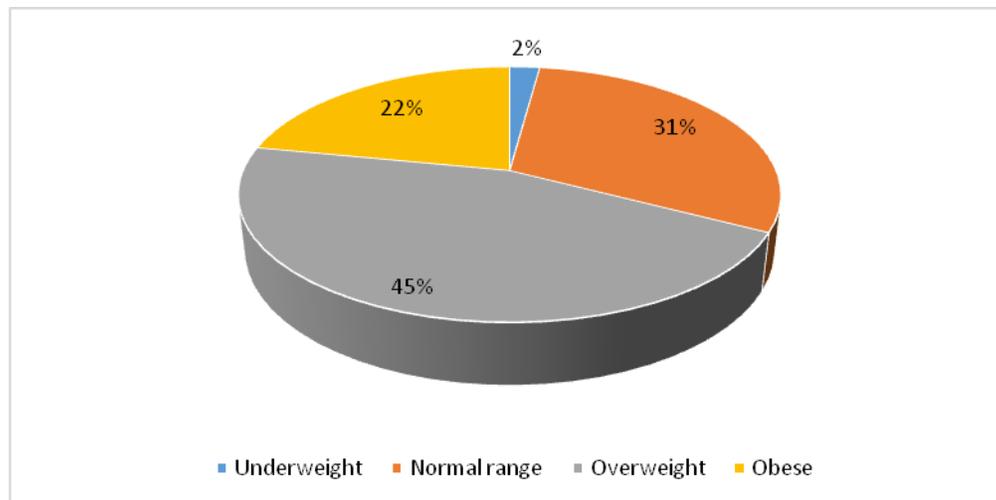
The majority of patients were living in Abha city (70%), followed by Khamis Mushet (6%), and Mahayel (3%) as shown in table 2.

Table (2): Residence of involved patients:

| | Frequency | Percent |
|---------------|------------|---------------|
| Abha | 137 | 70.3% |
| Al-Ahad | 1 | 0.5% |
| Aldarb | 1 | 0.5% |
| Almujaredah | 1 | 0.5% |
| Alnemas | 1 | 0.5% |
| Bani Malik | 1 | 0.5% |
| Jazan | 5 | 2.6% |
| Khamis Mushet | 12 | 6.2% |
| Mahayel | 6 | 3.1% |
| Rujal Alma | 1 | 0.5% |
| Sarat Abedah | 3 | 1.5% |
| Tathleeth | 1 | 0.5% |
| Other | 25 | 12.8% |
| Total | 195 | 100.0% |

The mean of BMI of the patients was $(28.37 \pm 8.33 \text{Kg/m}^2)$. The majority were overweight (45.45%) followed by 31% who were within the normal range. Obese patients were 22% of cases and only 2% of were underweight as shown in figure 2.

Figure 2: Frequency of different body mass index values for involved patients:



Concerning etiology of obstructive jaundice, the results showed that most of patients were presented with gall stones (82%), while 12.6% were presented with narrowing of the bile duct. Cysts and pancreatic cancer were Identified in 3.7% for each. Pancreatitis was reported in 1.6%, liver cancer in 1.1%, and the least presentation (0.5%) was with gallbladder cancer and mirrizi syndrome as shown in **table 3**.

Table (3): Frequency of different etiologies of obstructive jaundice:

| | Frequency | Percentage |
|----------------------------|------------|---------------|
| Gall Stones | 156 | 82.1% |
| Cysts | 7 | 3.7% |
| Narrowing of the bile duct | 24 | 12.6% |
| Pancreatitis | 3 | 1.6% |
| Pancreas cancer | 7 | 3.7% |
| Liver cancer | 2 | 1.1% |
| Gallbladder cancer | 1 | 0.5% |
| Mirrizi syndrome | 1 | 0.5% |
| Total | 195 | 100.0% |

It was clear that the most common way in managing patients with obstructive jaundice was the endoscopic retrograde cholangio-pancreatography (ERCP) which was done for more than half of reviewed patients (51%). were done for 37% of included patients. In addition, the least commonly used ways in obstructive jaundice management were “Removal of ERCP Stent”, “Hepatobiliary surgery” and “ERCP + MRCP (magnetic resonance cholangio-pancreatography)” as shown in **table 4**.

Table (4): Frequency of different management methods:

| | Frequency | Percent |
|--------------------------|------------|---------------|
| ERCP | 100 | 51.3% |
| Cholecystomy | 72 | 36.9% |
| ERCP and cholecystectomy | 8 | 4.1% |
| Conservative | 6 | 3.1% |
| Refuse treatment plan | 3 | 1.5% |
| Removal of ERCP Stent | 2 | 1.0% |
| Hepatobiliary surgery | 2 | 1.0% |
| ERCP + MRCP | 2 | 1.0% |
| Total | 195 | 100.0% |

The complications after treatment were reviewed, the findings showed that only 4 patients had complications, 2 of them suffered from cholangitis, while one patient had bile duct injury, and the other one had had pancreatitis. Concerning the outcomes of treatment using different treatment modalities, around 93% of the patients had improved and were discharged, while 7% didn't show any signs of improvement as shown in **table 5**.

Table (5): Outcomes of obstructive jaundice treatment:

| Treatment outcomes | Frequency | Percent |
|--------------------|------------|---------------|
| IMPROVED | 181 | 92.8% |
| NOT IMPROVED | 14 | 7.2% |
| Total | 195 | 100.0% |

By studying the relationships between background characteristics of patients and their treatment outcomes, we found that the relation between patient's BMI and either if patient improved or not was not statistically significant (p-value = 0.569). On the other hand, we shall highlight that all underweighted patients were improved, as shown in table 6.

Table (6): Relation between body mass index of patients and their treatment outcomes

| BMI | Treatment outcomes | | P-value |
|--------------|--------------------|--------------|---------|
| | Improved | Not improved | |
| Underweight | 4 (2.3%) | 0 (0) | 0.569 |
| Normal range | 53 (30.8%) | 3 (21.4%) | |
| Overweight | 79 (45.9%) | 6 (42.9%) | |
| Obese | 36 (20.9%) | 5 (35.7%) | |

However, the relation between management ways and its outcomes were statistically significant (p-value<0.001). Those patients who did "Cholecystectomy", ERCP with MRCP, or ERCP with cholecystectomy all are improved. Two patients who did Hepatobiliary surgery did not show any signs of improvement as shown in table 7.

Table (7): Relation between management methods and their outcomes:

| MANAGEMENT METHOD | OUTCOME | | | | P-value |
|--------------------------|----------|--------|--------------|--------|---------|
| | Improved | | Not improved | | |
| | No. | % | No. | % | |
| Cholecystomy | 72 | 100.0% | 0 | 0% | <0.001 |
| Conservative | 5 | 83.3% | 1 | 16.7% | |
| ERCP | 90 | 90.0% | 10 | 10.0% | |
| ERCP + MRCP | 2 | 100.0% | 0 | 0% | |
| ERCP and cholecystectomy | 8 | 100.0% | 0 | 0% | |
| Hepatobiliary surgery | 0 | 0% | 2 | 100.0% | |

In addition, there were a significant relation between etiology and treatment outcome of the patient's condition (p-value <0.001). Ninety five percent of those patients who had gall stones were improved, while only 5% of them were not improved. Table 8 shows that all patients with cysts, pancreatitis and mirrizi syndrome were all improved. On the other hand, it seems like three quarters of patients with Pancreatic cancer were not improved. In the same way, the relation between patient's age and the management way was statistically significant.(p-value <0.001)

Table (8): Relation between etiology of obstructive jaundice and treatment outcomes:

| Etiology | OUTCOME | | | | P-value |
|----------------------------|----------|--------|--------------|-------|---------|
| | Improved | | Not improved | | |
| | No. | % | No. | % | |
| Gall Stones | 148 | 94.9% | 8 | 5.1% | <0.001 |
| Cysts | 7 | 100.0% | 0 | .0% | |
| Narrowing of the bile duct | 22 | 91.7% | 2 | 8.3% | |
| Pancreatitis | 3 | 100.0% | 0 | .0% | |
| Pancreas cancer | 2 | 28.6% | 5 | 71.4% | |
| Liver cancer | 0 | .0% | 0 | .0% | |

DISCUSSION:

The objectives of this study were to identify the most common etiology of the disease, the most commonly used treatment modalities and their outcomes. The secondary objectives were to detect if there is a relation between age, BMI and obstructive jaundice. Therefore, the study included all surgical cases of obstructive jaundice aged 18 years and above admitted at Aseer Central Hospital for a whole one year.

Studies on gastrointestinal diseases are important studies because they have a role in detection of the causes of the disease and developing appropriate solutions to reduce its incidence.

The mean age for our patients was 43.9 years which is nearly similar to **Ankur Attri et al**,⁽⁸⁾ whose results showed that the mean age for patients with obstructive jaundice is 50 years and also similar to **V. Gopalakrishna et al**,⁽⁹⁾ whose results showed that mean age for patients is 40 years.

Our results showed that females (72%) are more affected by obstructive jaundice than males (28%) and this agrees with **Chandra Roy et al**⁽¹⁰⁾ whose results showed that obstructive jaundice including its benign and malignant causes are more prevalent in females more than males. **V. Gopalakrishna** (9) reported similar findings which showed that 60% of patients are females and 40 % of them are males.

Concerning etiologies of obstructive jaundice, our study results showed that most of patients presented with gall stones (82%), while narrowing of the bile duct percentage was 12.6%, cysts and pancreatic cancer were (3.7%) separately. Pancreatitis was reported as a cause for obstructive jaundice in 1.6%,

liver cancer in 1%, and the least etiology was the gallbladder cancer (0.5%). These findings agree with **Chandra Roy et al**, (10) whose results showed that Choledocholithiasis represent the most common cause of benign obstructive jaundice (26%), followed by biliary stricture (8%) and cysts represent (4%). While its results represent higher percentages of malignant causes where pancreatic cancer represents 30% of cases and cancers of gallbladder represents 22% of cases. In addition, the study findings also agree with **V. Gopalakrishna** (9) whose results showed that choledocholithiasis represent the most common cause of obstructive jaundice (43%) and that narrowing of bile duct represent 14% of cases and pancreatic cancer represent 5% of cases.

However, our results concerning etiologies are different from **E. Björnsson et al**, (11) study which was done in Gothenburg hospitals, Sweden which showed that the most common cause of jaundice was malignancy (33.5%) followed by alcoholic liver disease which was the second most common cause representing (16.7%), followed by bile duct stones (16.1%).

This difference may be due to different demographic characters, higher values of bilirubin in **E. Björnsson** (11) study and also his study involved causes of hepato-cellular and obstructive jaundice together.

Different findings were reported by **Ankur Attri** (8) study which showed that strictures represent 32% of cases, choledocholithiasis represent 16% of cases; but agrees with it in that each of choledochal cyst and mirrizi syndrome represent 2% of cases.

Concerning the different management modalities for obstructive jaundice, our results showed that the most commonly used method is ERCP (51.3%) and that

cholecystectomy was used in 36.9% of cases. This agrees with **Adam RH et al** (12) whose results showed that ERCP is used in 54% of obstructive jaundice cases treatment and cholecystectomy was used in 33% of cases.

Concerning the outcomes of management methods used in treatment of obstructive jaundice cases, our results showed that 90% of patients who undergo ERCP have been improved completely while only 10% did not improve and this agrees with **Suissa A et al**,(13) whose results showed that success rate after ERCP was 92%.

Concerning complications of treatment methods, our results showed that only 2% of cases developed complications from which 0.5% presented with pancreatitis. These proportions are less than those presented by **Suissa A et al**, (13) whose results showed that 10% of cases presented with complications from which 4% developed pancreatitis.

CONCLUSION / RECOMMENDATIONS:

We conclude from this study that the incidence of obstructive jaundice is 242 per 1000 surgical cases. Females and adults between 22-35 years are at a higher risk of obstructive jaundice. The most common causes of obstructive jaundice are gallstones or pancreatic cancer. The most common treatment interventions were ERCP and cholecystectomy which were associated with more than 90% improvement rate.

This high improvement rate could be attributed to many factors such as the increasing governmental support for the hospitals, the use of advanced medical technology and equipment, and the recruitment of highly qualified healthcare professionals.

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