A STUDY OF THE PREVALENCE OF ANEMIA IN GALLSTONES PATIENTS AT SOUTHERN LIBYAN REGION

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ABSTRACT

Gallstones are the most common gastrointestinal and liver diseases related to the gallbladder, affecting millions of people worldwide. The aim of this study was to evaluate the relationship between gallstones and anemia in patients with gallstone disease who had cholecystectomy. All volunteers those agreed to participate in this study, signed consent form and filled a short questioner. 120samples were collected between 1st of March to 1st of July 2022 at Sebha Medical Center. The samples were divided into two groups as follows: control group (60 sample), and the gallstones patient group (60 sample). Complete blood count (CBC) was done by the automated hematology analyzers Sysmex analyser. blood group, body mass index (BMI). The results showed that, the most common type of gallstones was cholesterol stones, followed by pigment stones, then mixed stones. The results of hematological profile showed that there were no significant differences between control and gallstone groups only in red blood cells (p=0.019). Also, there were no significant differences between the control and gallstone in female group, while the results showed that, there was a significant difference only in WBC (0.038) and PLT (P = 0.033) for the male group compared to the control group. Moreover, 26% of the control group had anemia, while 45% of gallstone group were suffering from anemia. Blood group type (O) was the most common in the control and patient groups (78.3% and 70.0%) Respectively, while, those with blood group were more susceptible to gallstones. The study concludes that the prevalence of anemia was higher among patients with gallstones, and anemia in female was higher than that of male.

KEYWORDS: Anemia, gallstones. hematological profile. blood group.

1. INTRODUCTION

Archaeologists have found human gallstones originating from the 17th century B C in Mycenae, Greece, which suggests that humankind, has been suffering from this disease for at least 4000 years(Luo et al., 2007, Chen et al., 2012).

Gallstones are a common clinical finding in the Western populations. Ultrasound studies indicate mean prevalence rates of 10–15% in adult European. In addition, of 3–5% in African and Asian populations In American Indians. Gallstone disease is epidemic and found in 73% of adult female Pima Indians and in 30% of male and 64% of female in other American Indians in the United States. Gallstones [mostly cholesterol (∼85%) and "black" pigment (∼15%) stones] is one of the most prevalent and costly digestive diseases. (Kratzer et al., 1999, Everhart Je, 1999, Everhart et al., 2002, Marschall and Einarsson, 2007, Ibiebele et al., 2017).

The human gallbladder is a pyriform sac that lies in the gallbladder fossa. A depression located on the inferior surface of the liver. Three regions that is the neck, corpus, and fundus, of the gallbladder. The human gallbladder is 7 to 10 cm long, 3 to 4 cm broad, in adults. Its capacity is approximately 50 ml. the thickness of the gallbladder wall can measure up to 2 mm.(Ganong, 2015).

Bile juice is important in the process of digesting fats in the digestive system. The gallbladder is a stimulated by the intestinal hormone cholecystokinin (CCK) to secrete bile juice, whose function is to emulsify fats to facilitate the breakdown and absorption of fats, especially since some important vitamins for the human body are fat-soluble, such as vitamin (A.E.D.K). As well as bile, it is important to get rid of excess cholesterol, either in the form of cholesterol or after its transformation into bile acids.(Luo et al., 2007, Ganong, 2015) Some components of the bile juice are absorbed in the intestine, in normal conditions; most bile acids

(approximately 95%) are reabsorbed from the intestine into the portal vein, taken up by hepatocytes and reexcreted back into bile.(Housset et al., 2016) Approximately 5% of bile consists of organic and inorganic solutes of considerable complexity.(Barrett et al., 2010) Gallstones are a classified as, cholesterol, pigmented or mixed stones. Gallstones range in size from as small as a grain of sand to as large as a golf ball.(Marschall and Einarsson, 2007, Clavien, 2008, Halgaonkar et al., 2016).

Anemia is a condition in which the number of circulating red blood cells, the concentration of hemoglobin (Hb), or the percentage volume of packed red blood cells in a centrifuged blood specimen (hematocrit [Hct]) is lower than normal. The World health Organization (WHO) criteria for anemia are Hb less than 12 g/dL in premenopausal women and less than 13 g/dL in men and postmenopausal women. Anemia can be an isolated condition, such as that caused by a nutritional deficiency (eg, iron, folate, vitamin B12), or it may develop secondary to another disease or its treatment.(Penninx et al., 2003, Patel, 2008, Smith Jr, 2010, Organization, 2011, Hoffbrand, 2015).

2. MATERIALS AND METHODS
The study was conducted in city of Sebha (south of Libya), from 1st march 2022 to 1st July 2022 on 120 people divided in to two groups (control group (60) and gallstone group (60) of both gender whose attended Sebha medical center.

5 ml venous blood samples were collected and placed in tubes containing EDTA anticoagulant for complete blood count test and ABO test. Body mass index (BMI) was calculated as weight (Kilograms) divided by square height (meters). The Microsoft Office and SPSS based on windows 2010 program were used for statistical test. The probability was calculated at a significant < 0.05.

3. RESULTS
3.1. Gender and age
The mean of age of the control group was (47.95 ± 14.24) and for gallstone group was (47.93 ± 12.79) years. Statistically, there was no significant difference between the two groups. To study which age group is most affected by gallstones, participants were divided into three age groups, depending on the hormonal changes during the stages of age. The results in gallstone group showed that, the first age group under 18 years had 0 samples (0%), the age group from 19 to 45 years old had 44 samples (73.7%) and the age group over 45 years had 16 samples (26.3%).

3.2. Body mass index
The BMI of control group was (25.2%) and it was (26.7%) for gallstone group. Statistically, there was no significant difference between the two groups (P.V = 0.699).

Depending on the BMI values, the result in control group found that, 30 of the participants had normal weight, 23 were overweight, and 7 were obese. While in gallstone group 16 had normal weight, 35 were overweight and 8 people were obese. as shown in Table (3-1).

Table-3 1: Showing the result of the body mass index.

BMI	Control Group N=60	Gallstone Group N=60
Underweight < 18.5	0%	%0
Normal weight from 18.5-24.9	30 (50%)	26.6%(16)
Over weight 25-29.9	23 (38.3%)	35 (58.3%)
obesity > 30	7 (11.6%)	8(13.3%)
P. Value	0.699	

3.3. Types of gallstones
Gallstones are classified into three types: cholesterol, pigmented and mixed stones. Result of this study showed that 30 samples (50%) were cholesterol stones (36.6% male, 63.4% female), 26 samples (43.3%) were pigmented stones (26.9% male, 73.1% female), while 4 samples (6.7%) were mixed stones (25% male, 75% female). As shown in Figure (3-1)
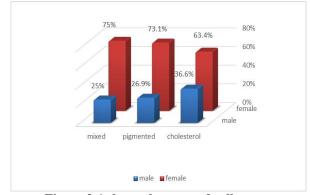

Figure 3-1 shows the types of gallstones.

3.4. The results of the shape and texture of gallstones
By studying the morphology of gallstones, it was found that, 28 samples (41.7%) had a regular shape and 32 samples (53.3%) had an irregular shape. While 34 samples (56.7%) had a smooth texture and 26 samples (43.3%) had a rough texture as shown in table (3-2).

Table 3-1: Showing the external shape & texture of different types of gallstones.

Parameter	Parameter	Cholesterol	Pigmented	Mixed
External morphology N=60	Regular N=28(41.7%)	N=18 (64.3%)	N=9 (32.1%)	N=1 (3.6%)
	Irregular N=32(53.3%)	N=12 (37.5%)	N=17 (53.1%)	N=3 (9.4%)
External texture N=60	Smooth N=34(56.7%)	N=18 (52.9%)	N=14 (41.2%)	N=2 (5.9%)
	Rough N=26(43.3%)	N=11 (42.3%)	N=13 (50%)	N=2 (7.7%)

3.5. The results of hematological profile for control and gallstone groups

The results of hematological profile for the control and gallstone groups showed that, there were no significant difference between control and gallstone groups except red blood cells (p=0.019). As shown in the table (3-3)

Table 3-2: Showing the hematological profile for control and gallstone groups.

Groups Parameter	Control group N=60	Gallstone group N=60	P.V
Haemoglobin (g/dl)	12.9 ± 1.2	12.4 ± 1.4	0.090
Red blood cells (10^6 cells/mm^3)	4.8 ± 0.7	4.5 ± 0.4	0.019[*]
White blood cells (10^3 cells/mm^3)	7.0 ± 1.1	7.2 ± 1.3	1.00
Platelets count (10^3cells/mm^3)	273.5 ± 63.9	293.7 ± 92.0	0.539
Mean cell volume (fl)	81.6 ± 1.9	80.9 ± 2.8	0.688
Mean cell haemoglobin (pg/cell)	27.9 ± 1.3	27.3 ± 1.6	0.241

3.5.1. The results of hematological profile for the female group

The results of hematological profile for the control and gallstone female group showed that, the concentration of hemoglobin for the control and gallstone group was (12.0 ± 1.1 g / dL and 12.1 ± 1.2 g / dL) respectively. By conducting the statistical analysis, it was found that there were no significant differences. The results also showed that there were no significant differences for the rest of the studied blood parameters. As shown in the table (3-4).

Table 3-4: Showing the hematological profile for female in both groups.

Groups Parameter	Control group N=30	Gallstone group N=41	P.V
Haemoglobin (g/dL)	12.0 ± 1.1	12.1 ± 1.2	0.710
Red blood cells (10^{12}/L)	4.6 ± 0.6	4.5 ± 0.4	0.555
White blood cells (10^6/L)	6.9 ± 1.1	7.0 ± 1.4	0.895
Platelets count (10^6/L)	284.3±61.4	283.7 ± 92.7	0.873
Mean cell volume (fl)	81.0 ± 1.5	80.6 ± 3.2	0.610
Mean cell haemoglobin (pg/cell)	27.6 ± 1.3	27.0 ± 1.8	0.142

3.5.2. The results of hematological profile for the male group

The results of the hematological profile for the control and gallstone male groups showed that the concentration of hemoglobin for the control samples was (13.3 ± 1.5 g / dL) and in the gallstone samples it was (13.3 ± 1.4 g / dL). Statistically, there was no significant differences between the two groups. While there were significant differences in the white blood cells (p=0.003) and platelets (p=0.038) and there were no significant differences in the rest of the haematological parameters. As shown in Table (3-5).

Table 3-5: Showing the hematological profile for male in both groups.

Groups Parameter	Control group N=30	Gallstone group N=19	P.V
Haemoglobin (g/dL)	13.3 ± 1.5	13.3 ± 1.4	0.993
Red blood cells (10^{12}/L)	5.0 ± 0.7	4.9 ± 0.5	0.675
White blood cells (10^6/L)	7.1 ± 1.1	7.8 ± 0.9	0.033[*]
Platelets count (10^6/L)	267.8±62.5	318.4 ± 88.4	0.038[*]
Mean cell volume (fl)	81.8 ± 2.2	81.6 ± 1.7	0.960
Mean cell haemoglobin(pg/cell)	27.8 ± 1.5	27.8 ± 0.8	0.787

3.6. Results of anemia at male group

According to the World Health Organization (WHO) The male group was divided into two groups (according to the hemoglobin concentration): Abnormal (anemia) hemoglobin concentration (Hb < 13 g/dL), while normal hemoglobin concentration (Hb ≥ 13 g/dL) (WHO, 2001). The results of the male control group showed that 6 samples (20%) had a low concentration of hemoglobin (anemia). while 9 samples (47.4 %) of male gallstone group were anemic.

3.7. Results of anemia at female group

According to the (WHO), the female group was divided into two groups (according to the hemoglobin concentration): Abnormal (anemia) hemoglobin concentration (Hb < 12 g/dL) and normal hemoglobin concentration (Hb ≥ 12g/dL) (WHO, 2001). The results of the female control group showed that 10 samples (33.3%) had a low concentration of hemoglobin (anemia). while 18 samples (43.9%) of female gallstone group were anemic.

Based on the above results, 16 samples (26.6%) of the control group were suffering from anemia, and 27 samples (45%) of the gallstone group were suffering from anemia. As shown in Table No. (3-6)

Table 3-6: Distribution of groups according to anemia.

Control group N=60	Normal N= 44 (73.4%)	Female N=20(45.5%)
		Male N=24 (54.5%)
	Anemic N= 16 (26.6%)	Female N=10 (62.5%)
		Male N=6 (37.5%)
Gallstone group N=60	Normal N= 33 (55%)	Female N=23(69.7%)
		Male N=10 (30.3%)
	Anemic N= 27 (45%)	Female N=18 (66.7%)
		Male N=9 (33.3%)

3.8. The results of blood group

Table No. (3-7) shows that blood group (O+) was the most prevalent in the control and gallstone groups, followed by blood group (A+), then (B+) and finally (AB+). Also the result shown that, there was an increase in the (A+ blood group) in the gallstone group (12 (20%)) cambered to control group(6 (10%)), which amounted to double, which gives an indication that the carriers of this blood group are more susceptible to gallstones.

Table 3-7: Showing the percentages of the types of blood groups for the participating samples.

Control group			Gallstone group		
Blood group	**N= (60)**	**(%)**	**Blood group**	**N= (60)**	**(%)**
(O$^+$)	47	78.3%	(O$^+$)	42	%70
(A$^+$)	6	10%	(A$^+$)	12	%20
(B$^+$)	5	8.3%	(B$^+$)	6	10%
(AB$^+$)	2	3.4%	(AB$^+$)	0	%0

4. DISCUSSION

Gallstone disease (GSD) is one of the most common diseases that affect the digestive system, affecting almost a quarter of female and 10_15% of male over the age of fifty. It is more prevalent among Amerindians and Mexicans and less common among Africans. The main risk factors for gallstones are age, gender and obesity.(Diehl, 1991) Anemia in childhood and adolescence is considered one of the serious health problems faced by both developing and developed countries alike, because of its serious negative effects on growth, neuromuscular development, the ability to learn, educational attainment, and the ability to conceive.(Booth and Aukett, 1997) In this study, the percentage of women and men infected with gallstones was 68.3%, and 31.7% respectively. This indicates and confirms that gallstone disease is linked to sex. where women are more susceptible to infection in a ratio of 1:2 and this is consistent With both a study conducted in China(Sun et al., 2009) and a study conducted in the Uighur region and Han China.(Zhu et al., 2014) a study conducted among residents of Riyadh, Saudi Arabia.(Alishi et al., 2017) and another study in Iraq. (Khalaf et al., 2016).

The percentage of people representing the age group 19_45 years was 73.3% and older than 45 years was 26.7%, and this confirms the findings of previous studies that age is associated with the incidence of gallstones.(Zhu et al., 2014, Salinas et al., 2004).

The results of BMI in this study showed that overweight and obesity are risk factors for developing gallstones, this is consistent with previous study conducted on the population in Thailand.(Panpimanmas and Manmee, 2009) and a study conducted in the state of California in the United States.(Koebnick et al., 2012) and another study conducted in Italy (Bonfrate et al., 2014) All of these studies confirmed that obesity is a risk factor for developing gallstones.

It was found out that 50% of the patients had cholesterol stones, 43.3% had pigment stones, and 6.7% had mixed stones. This is consistent with previous studies, including a study conducted in Italy (Attili et al., 1997), and another study conducted in London, United Kingdom (Lee et al., 2015).

When studying the morphological properties of gallstones, it was found that 41.66% had a regular shape, 53.33% had an irregular shape, and 56.66% had a smooth external texture, while 43.33% had a rough external texture, and this is consistent with the study conducted in Sebha, southern Libya.(Ekrim et al., 2022)

According to our finding, blood group (O$^+$) was mostly present in 70% of patients of gallstones followed by (A$^+$). We find that it is consistent in terms of the prevalence rates of each blood group separately with a study conducted in the city of Sebha in southern Libya, which studied the distribution of blood groups in the city.(Matough et al., 2019) and with another study conducted in the city of Al-Bayda in eastern

Libya.(Saad, 2016) in both studies The O$^+$ blood group was the most prevalent, followed by the A$^+$ group, followed by the B$^+$ group, and then the AB$^+$ group.

The prevalence of anemia of this study shows that, 26% of control, 62.5% of female and 37.5% of male groups had anemia, and 45% of the gallstone group suffered from anemia, 66.7% were female and 33.3% male. As shown in Table (3-5). From these results, we find that the prevalence of anemia in female group was higher than in male group, this was consistent with a study conducted in India. The prevalence of anemia in women was higher than in men in the study and control group.(Sahay et al., 2019).

4. REFREANSES

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