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# Etiology and Epidemiology of Obstructive Jaundice in Continental Croatia

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## ABSTRACT

*The etiology and epidemiology of obstructive jaundice in Continental Croatia has been studied in 174 patients. The objective of this research was also to explore the importance and efficiency of endoscopic retrograde cholangiopancreatography (ERCP) as a non-surgical method of treatment of obstructive jaundice in the population of Continental Croatia. Obstructive jaundice is the illness of elderly population which is also confirmed by the information on the average age of our patients. The frequency of illness is higher among female population, and the most frequent cause of obstructive jaundice are gallstones (54.1% of patients). In 29.8% of patients the primary or secondary malignant disease was the cause of blockage in gall flow and subsequent jaundice, and the most frequent malignant cause of obstructive jaundice is pancreas cancer in 11.5% of patients. The mean value of serum concentrations of total bilirubin, alkaline phosphatase, aspartate aminotransferase, alanine aminotransferase and gamma glutamyltransferase 24 hours before the biliary decompression by ERCP has been significantly above the upper referential value, and 24 hours after the ERCP it has dropped to normal with their statistically significant difference ( $p < 0.0001$ ). The normal values of markers for synthetic liver function (total proteins and prothrombin time) have been noticed as well as elevated values of inflammatory markers in obstructive jaundice independently of etiology. Out of the total number of patients, 37.7% required the surgical treatment while 60.3% of patients were treated by ERCP, i.e. either the stone extraction or the implantation of endobiliary stent was performed.*

**Key words:** *etiology, epidemiology, obstructive jaundice, Continental Croatia, liver damage, ERCP*

## Introduction

Obstructive jaundice is characterized by the retention of bile components developed in hepatocytes due to the development of obstruction in the biliary drainage system. By the increase of bile duct pressure and by the increase of concentration of bile salts, conjugated bilirubin and electrolytes proximally from the obstruction of bile flow, mostly epithelial cells of bile ducts and after them hepatocytes are exposed to acute damage. Reversible structural and functional cell changes appear and they are verified by high serum values in markers for liver parenchyma damage, inflammatory markers and bilirubin. The recent literature describes the gallstones which are the illness of more than 10% of general population as the most frequent cause of obstruction in the biliary drainage system. The occurrence of the most frequent cholesterol stones is connected with the manner and place of

living, nourishment and sex<sup>1</sup>. In Continental Croatia, compared to the Mediterranean climate, the nourishment is mostly rich in fats, which leads to the increase in the number of obese people. Some malignant diseases, most frequently pancreatic cancer, are often indicated by obstructive jaundice<sup>2</sup>. ERCP as endoscopic radiological method is recognized both as diagnostic and non-surgical therapeutic method in the treatment of obstructive jaundice.

## Materials and Methods

### *Subjects*

The study has been carried out as a retrospective study that included 174 patients with obstructive jaundice from the area of Zagreb and its surroundings, i.e.

**TABLE 1**  
CHANGES FOLLOWING BILIARY DRAINAGE IN PATIENTS WITH OBSTRUCTIVE JAUNDICE

	24 h before ERCP-a means±S.D.	24 h after ERCP mean ±S.D.	Statistics
BIL ( $\mu\text{mol/L}$ )	132.2±17.3	23.1±16.2	t=8.64 p<0.0001
AST (U/L)	151±158	36±21	t=10.316 p<0.0001
ALT(U/L)	205±213	58±37	t=10.002 p<0.0001
AF (U/L)	341±313	107±50	t=10.98 p<0.0001
GGT (U/L)	579±58	89±61	t=11.801 p<0.0001
FIB g/L	6.1±1.9	5.0±1.5	t=15.097 p<0.0001
PV (%)	93±13	95±9	t=2.615 p<0.0097
TP (g/L)	71±9	–	–

BIL – bilirubin, AST- aspartate aminotransferase, ALT – alanine aminotransferase, AF – alkaline phosphatase, GGT – gama glutamiltransferase, FIB – fibrinogen, PV – prothrombin period, TP – total proteins, t-Studentov t-test, p<0.05, X – mean value, SD – standard deviation

from Continental Croatia. All patients have been hospitalized on the Department of Gastroenterology in Dubrava University Hospital. Out of 174 patients who were included in the study, there were 95 women (54.6%) and 79 men (45.4%) in the age range from 23 to 96, the average age being 67. The patients have been included in the study pursuant to the anamnaestic data on the occurrence of yellow skin and sclera 72 hours before admission to hospital, pursuant to the data on high values of total and conjugated bilirubin, gamma glutamyltransferase, alkaline phosphatase and echosonographically recorded increased diameter of the main bile duct of over 6 mm. The study does not include pregnant women, nursing mothers and patients whose data included the anamnaestic data on alcohol and drug consumption. All patients have been tested to viral hepatitis and the tests were negative.

### Methods

The samples of venous blood of the studied group of patients were taken in the morning, 24 hours before and 24 hours after ERCP on an empty stomach and were analyzed in the biochemical laboratory of the Dubrava University Hospital. The endoscopic retrograde cholangiopancreatography was performed for all patients. During the ERCP on the particular number of patients the stone extraction or the implantation of endobiliary stent was performed, depending on the etiology of obstructive jaundice. During the data processing and analysis of results, the parameters of descriptive statistics have been used: mean value, standard deviation, median, minimal and maximal value, and a 95% confidence interval. For the testing of quantitative variables between two groups Student's t-test has been used, as well as chi-squared test. The difference significant p value has been determined as p<0.05.

### Results

Of the total number of patients, 70.2% were patients with benign causes of obstructive jaundice and 29.8% were patients with malignant primary or secondary dis-

ease. The leading causes of obstructive jaundice were gallstones and that was the case in 54.1% of patients. Gallstones of the main bile duct have been verified in 21.3% of patients. The most frequent malignant cause of obstructive jaundice and the runner-up after gallstones is pancreatic cancer in 11.5% of patients, and in 85% of the cases it is found in the pancreatic head. After that follow cancer of papillae Vateri (5.2%), stenosis inflammation of papillae Vateri (4.6%), chronic pancreatitis (4.6%), biliary stenosis (4.6%), Klatskin tumor (4.0%), gall cancer (3.4%), cholangiocarcinoma (2.3%), juxtapapillary diverticula (1.7%), liver tumor (1.2%), metastasis of liver (1.1%), Non-Hodgkin tumor (1.1%) and Mirizzi's syndrome (0.6%). A statistically significant decrease (p<0.0001) of serum values of gamma glutamiltransferase, alkaline phosphatase and bilirubin has been noticed 24 hours before and after the decompression of biliary drainage system by ERCP (Table 1). The indicators of synthetic liver function (serum values of total proteins and prothrombin time) have also been within the referential range independently of etiology (Table 1), along with the noticed high values of inflammatory markers, erythrocyte sedimentation and fibrinogen (Table 1). Out of the total number of patients, 60.3% of them were treated conservatively by ERCP method. On 37.7% of patients it was necessary to perform the surgical treatment after ERCP. On 45.4% of patients the extraction of stones was performed, and in 27% of cases the implantation of biliary endoprosthesis was performed.

### Discussion

Obstructive jaundice is the illness of people in the medium or elderly age group with the increase in the number of sick people, which conforms to the prolonged life, increased number of gallstone patients and increased number of patients suffering from malignant diseases. The modern way of life and nourishment causes the increased incidence of cholesterol gallstones<sup>3</sup>, and the characteristic of the nourishment in the Continental Croatia is the food rich in fats. This study shows that gallstones

are the most frequent cause of obstructive jaundice in patients from the area of Continental Croatia, the percentage of sick women being higher. The average age of our patients was 67 years which is completely in accordance with the data from the recent literature<sup>4</sup>. In 50% of cases jaundice is the first symptom of pancreatic cancer which is the leading malignant cause of obstructive jaundice within the examined group of patients. Unfortunately, the largest number of pancreatic cancers at the time of discovery is inoperable, and they are most frequently treated as a palliative measure with a method of implan-

tation of endoprosthesis during endoscopic retrograde cholangiopancreatography<sup>5</sup>. ERCP is a diagnostic and therapeutic method of unquestionable importance when considering the results of this research. The timely performed decompression of biliary system regardless of etiology, stipulates a mild damage of liver parenchyma, and a faster, safer and most certainly a less expensive recovery of our patients. Croatia has recognized the problem and by establishing ERCP centers it has improved the health care for our patients.

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## ETIOLOGIJA I EPIDEMIOLOGIJA OPSTRUKCIJSKE ŽUTICE U KONTINENTALNOJ HRVATSKOJ

### SAŽETAK

U radu je istraživana etiologija i epidemiologija opstrukcijske žutice područja kontinentalne Hrvatske kod 174 ispitanika. Cilj ovog istraživanja također je bio istražiti značaj i učinkovitost endoskopske retrogradne kolangiopankreatografije (ERCP) kao nekirurškog načina liječenja opstrukcijske žutice u navedenoj populaciji. Opstrukcijska žutica je bolest starije životne skupine s čim je u skladu podatak da je prosječna dob naših ispitanika bila 67 godina. Učestalost oboljenja veća je u ženskoj populaciji budući su najčešći uzrok opstrukcijske žutice žučni kamenci (u 54,1% bolesnika). U 70,2 % bolesnika uzrok opstrukcijske žutice je bio benignan, dok je kod 29,8% bolesnika primarna ili sekundarna maligna bolest uzrokovala zastoj u protoku žuči i posljedičnu žuticu. Najčešći maligni uzrok opstrukcijske žutice je karcinom gušterače u 11,5% bolesnika. Srednje vrijednosti serumske koncentracije ukupnog bilirubina, alkaline fosfataze, aspartat aminotransferaze, alanin aminotransferaze I gama glutamiltransferaze 24 sata prije bilijarne dekompresije ERCP-om su bile znatno iznad referentnih vrijednosti, a 24 sata nakon ERCP padaju na normalu uz statistički značajnu razliku. Uočene su uredne vrijednosti biljega sintetske funkcije jetre (ukupnih proteina i protrombinskog vremena) i povišene vrijednosti upalnih biljega kod opstrukcijske žutice neovisno o etiologiji. Od ukupnog broja ispitanika 37,7% je zahtijevalo kirurški tretman, dok je 60,3% liječeno metodom ERCP-a, tj. učinjena je ekstrakcija kame-naca ili implantacija endobilijarnog stenta.