

# Identification and Stenting of Malignant Obstructive Jaundice: Determining the Success Rates of ERCP

Budi Tan Oto\*, Achmad Fauzi\*\*, Ari Fahrial Syam\*\*  
 Marcellus Simadibrata\*\*, Murdani Abdullah\*\*, Dadang Makmun\*\*  
 Chudahman Manan\*\*, Abdul Aziz Rani\*\*, Daldiyono\*\*

\* Department of Internal Medicine, Awal Bros Hospital, Batam

\*\* Division of Gastroenterology, Department of Internal Medicine, Faculty of Medicine University of Indonesia/Dr. Cipto Mangunkusumo General National Hospital, Jakarta

## ABSTRACT

**Background:** Malignant and benign lesions may cause obstructive jaundice. The treatment of these conditions includes biliary stenting drainage, percutaneous transhepatic biliary drainage (PTBD), or surgical procedures. In advanced malignant jaundice, stent placement often turns out to be difficult. The aim of this study was to determine the success rates of malignant obstructive jaundice detection utilising endoscopic retrograde cholangiopancreatography (ERCP) and its stent placement procedure.

**Method:** We conducted a retrospective study in 139 patients who undergone ERCP in Cipto Mangunkusumo Hospital between October 2004 and July 2008. Data was analyzed descriptively with SPSS version 17.0.

**Results:** Of 139 study subjects, 131 (94.2%) of them had clinical obstructive jaundice (direct bilirubin > indirect bilirubin level). There were 73 (55.7) male patients, with age range of 20-84 years. Among 114 patients with identified cause of obstruction, 57 (50%) patients had undergone stent placement; however, only 32 (56.1%) patients had successful stent placement. Our descriptive analysis showed that age and sex did not affect the stent success rates, and malignancy was showed to be a factor of stent failure.

**Conclusion:** ERCP appears to be reliable enough for identifying the cause of obstructive jaundice in most patients. In this study, the achieved success rate of stent placement is more than 50%. Moreover, such rate is lower in the malignant obstructive jaundice than the non-malignant counterparts. Papillary carcinoma is the most frequent cause of malignant obstructive jaundice.

**Keywords:** ERCP, obstructive jaundice, stenting, malignancy

## ABSTRAK

**Latar belakang:** Ikterus obstruktif dapat disebabkan oleh lesi yang bersifat ganas atau jinak. Pengobatan kondisi ini meliputi drainase stent bilier, drainase bilier transhepatik perkutan atau tindakan bedah. Seiring kemajuan keganasan penyakit kuning, pemasangan stent sering menjadi sulit. Tujuan penelitian ini adalah untuk mengevaluasi tingkat keberhasilan diagnosis ikterus obstruktif ganas menggunakan endoscopic retrograde cholangio-pancreatography (ERCP) dan pemasangan stent.

**Metode:** Studi retrospektif dilakukan pada 139 pasien yang menjalani prosedur ERCP di Rumah Sakit Cipto Mangunkusumo periode Oktober 2004 hingga Juli 2008. Data dianalisis secara deskriptif dengan program SPSS versi 17.0.

**Hasil:** Dari 139 subjek penelitian terdapat 131 (94,2%) pasien terdiagnosis klinis ikterus obstruktif (tingkat bilirubin direk > bilirubin indirek). Pasien laki-laki sebanyak 73 (55,7%) dan rentang usia pasien 20-84 tahun. Dari 114 pasien, terhadap 57 (50%) pasien dilakukan pemasangan stent, namun hanya 32 (56,1%) pasien yang berhasil. Analisis lebih lanjut menunjukkan bahwa usia dan jenis kelamin tidak mempengaruhi tingkat keberhasilan pemasangan stent, dan keganasan ditunjukkan sebagai faktor kegagalan pemasangan stent.

**Simpulan:** Tindakan ERCP cukup handal untuk mengidentifikasi penyebab ikterus obstruktif pada pasien. Tingkat keberhasilan pemasangan stent mencapai lebih dari 50%. Khusus untuk tingkat keberhasilan pemasangan stent pada ikterus obstruktif ganas lebih rendah dari ikterus obstruktif jinak. Karsinoma papiler adalah penyebab paling sering dari ikterus obstruktif ganas.

**Kata kunci:** ERCP, ikterus obstruktif, stenting, keganasan

## INTRODUCTION

Jaundice or asymptomatic hyperbilirubinemia is a common clinical problem that caused by a variety of disorders. For clinical purposes, the predominant type of bile pigments in the plasma can be used to classify hyperbilirubinemia into two major categories. Plasma elevation of predominantly unconjugated bilirubin suggests the overproduction of bilirubin (such as hemolysis), impaired bilirubin uptake by the liver, or abnormalities of bilirubin conjugation; while plasma elevation of both unconjugated and conjugated bilirubin indicates other etiologies such as hepatocellular disease, impaired canalicular excretion, or biliary obstruction.<sup>1-5</sup> The diagnostic approach to the jaundiced patients begins with a careful history taking, physical examination, and screening laboratory studies. A differential diagnosis is formulated and appropriate further testing is performed to narrow the diagnostic possibilities.<sup>6-8</sup>

The treatment of obstructive jaundice is primarily to solve the obstruction and maintain drainage, which can be done through ERCP, PTBD, or surgical procedures. The success rate of ERCP to diagnose is highly variable from 64 to 96.4% depending on operator, endoscopic procedure, and certainly the severity of disease.<sup>9-13</sup> The aim of this study was to determine the success rates of malignant obstructive jaundice detection utilising endoscopic retrograde cholangio-pancreatography (ERCP) and its stent placement procedure.

## METHOD

The study was conducted in 139 patients to determine the success rates of malignant obstructive jaundice identification using ERCP and success rate of stent placement in such patients in Cipto Mangunkusumo Hospital. This study was designed retrospectively using medical records of patients who had undergone ERCP between October 2004 and July 2008.

Identification was defined a success if it were hassle-free in identifying stone/mass in common bile duct (CBD) after cannulation procedure, or

identification of any mass before the cannulation took place. Stent placement in CBD was defined to be successful if the stent placement were able to be put in properly-fitted through any stenosis or stricture of CBD. This study included patients with direct bilirubin > indirect bilirubin level (clinical obstructive jaundice). Exclusion criteria comprised the inability to identify the etiology of obstruction, either malignant or non-malignant and incomplete data. Data entries were subsequently analyzed by using SPSS 17.0.

## RESULTS

Of 139 patients who had undergone ERCP examination, 131 (94.2%) of them had the clinical diagnosis of obstructive jaundice (direct > indirect bilirubin levels). Table 1 shows characteristic of the patients. Malignancies as the causes of biliary obstruction are shown in Table 2.

**Table 1. Demographic characteristics of the patients**

Characteristics	n (%)
Age (years)	
20-29	5 (3.8)
30-39	12 (9.2)
40-49	27 (20.6)
50-59	42 (32.1)
60-69	23 (17.5)
≥ 70	22 (16.8)
Sex	
Male	73 (55.7)
Female	58 (44.3)
Obstructive jaundice diagnostic	
No malignancy	66 (50.4)
Malignancy	48 (36.6)
Need futher diagnostic	17 (13.0)
Stent placement (n = 114)	
Yes	57 (50.0)
No	50 (43.9)
No data	7 (6.1)
Success rate of stent placement (n = 57)	
Success	32 (56.1)
Failed	25 (43.9)

**Table 2. Malignant causes of biliary obstruction**

Malignant causes	n (%)
Pancreatic cancer	15 (31.3)
Cholangiocarcinoma	9 (18.8)
Papillary carcinoma	21 (43.8)
Klatskin tumor	3 (6.1)

Based on the descriptive analysis, this study showed that age and sex did not affect the stent success rates and malignancy was shown to be a factor of stent failure, which was suggested by data of malignancy profile, i.e. 23 failed and 10 (30.3%) successful placement in patients with malignancy compared to the patients with non-malignancy of 2 failed and 22 (91.7%) successful placement. Thus, the success rate of stent placement in patients with malignant lesion was lower than those with non-malignant lesions.

## DISCUSSION

The word “jaundice” comes from the French word “jaune”, which means yellow. Jaundice is a yellowish staining of the skin, sclera, and mucous membranes by bilirubin, a yellow-orange bile pigment. Bilirubin is a breakdown product of heme rings, which is usually from metabolized red blood cells. The discoloration is typically detected on clinical situation once the serum bilirubin level rises more than 3 mg per dL (51.3  $\mu$ L).<sup>14</sup> Patients with non-infectious jaundice may have a complaint of weight loss or pruritus. Abdominal pain is the most common presenting symptom in patients with pancreatic or biliary tract cancers.<sup>15</sup> Even something as nonspecific as depression may be a presenting complaint in patients with chronic infectious hepatitis and in those with a history of alcoholism.<sup>16,17</sup> Occasionally, patients may present with jaundice and some extrahepatic manifestations of liver disease. Examples include patients with chronic hepatitis and pyoderma gangrenosum, and patients with acute hepatitis B or C and polyarthralgias.<sup>18-20</sup>

Diagnostic approach in patients with jaundice is started with a careful history and physical examination, and screening laboratory studies. A differential diagnosis is then formulated and appropriate further tests are performed to narrow the diagnostic possibilities.<sup>1-4</sup> The frequency of different causes that occurred varies with age and the population being studied. One report, for example, has evaluated the principal diagnoses obtained in 702 adults presenting with jaundice in 24 Dutch hospitals over a two-year period. Pancreatic or biliary carcinoma was accounted for 20%; gallstones for 13%; and alcoholic cirrhosis for 10%.<sup>21</sup> McNeilly suggested a novel role for bile acids in inhibiting hepatic glucocorticoid clearance, of sufficient magnitude to suppress hypothalamic-pituitary-adrenal axis activity. Suppression of the hypothalamic-pituitary-adrenal axis occurs in patients with cirrhosis and cholestasis and is associated with increased concentrations of bile acids.<sup>22</sup>

Obstructive jaundice is a clinical entity which was defined as increased bilirubin level (predominantly in direct form) caused by any obstruction in post-hepatic bile duct. Incidence rate of obstructive jaundice differs in each region and ethnicity. The treatment is principally aimed to solve the obstruction and maintain drainage, which consists of ERCP, PTBD, or surgical procedures.<sup>5-8</sup> Invasive diagnostic methods such as mechanical obstructive jaundice-endoscopic retrograde cholangio-pancreatography (ERCP), percutaneous transhepatic cholangiography (PTCG) are performed for indications in possibility to perform lithoextraction and effective endoscopic decompression or in the tumor of Vater’s papilla, in case of low block.<sup>23</sup> Periampullary and hepatic malignancies will often present with obstructive jaundice. For unresectable tumors, effective and lasting decompression of the biliary tree is essential method to improve quality of life and survival.<sup>24</sup>

In this study, further analysis showed that age and sex did not affect stent successfulness, and malignancy feature was shown to be a factor of stent failure. There were 23 failed and 10 (30.3%) successful cases in patients with malignancy compared to 2 failed and 22 (91.7%) successful cases in non-malignancy counterpart. The success rate of stent placement in malignancy was significantly lower than those with non-malignant lesions. It perhaps happened as this study had some limitations such as the status of referral hospital and therefore, patients who were admitted to the hospital appeared to have a more end-stage disease and greater complications. The success rate depends largely on the malignant feature of the causation. As increased severity in staging of malignancy will otherwise decrease the success rate; therefore, an early diagnosis and referral is needed. Patients had failed ERCP procedure should subsequently have PTBD or surgical procedures as soon as possible to avoid sepsis and other complications.

We encourage others to conduct a larger multi-center studies to evaluate contributing factors on the stent placement success rate, which include the serum transaminases levels, direct and indirect bilirubin level, alkaline phosphatase, and gamma glutamyl transpeptidase ( $\gamma$ -GT) level, etc. With such system, patients could be directly advocated to have the most appropriate procedures including those with the highest success rate. For cost-effectiveness reasons, the system should be established soon.

## CONCLUSION

ERCP appears to be reliable enough for identifying the cause of obstructive jaundice in most patients. In this study, the achieved success rate of stent placement is more than 50%. Moreover, such rate is lower in the malignant obstructive jaundice than the non-malignant counterparts. Papillary carcinoma is the most frequent cause of malignant obstructive jaundice.

## REFERENCES

1. Arteaga VA, Fromm H. The management of gallstones. In: Boyer TD, Wright TL, Manns MP, Zakim D, eds. *Zakim and Boyer's Hepatology: A Text Book of Liver Disease*. 5<sup>th</sup> ed. Canada: Saunders Elsevier 2003.p.1181-6.
2. Greenberger NJ, Toskes PP. Diseases of the gallbladder and bile ducts. In: Kasper DL, Fauci AS, Longo DL, Braunwald E, Hauser SL, Jameson JL, eds. *Harrison's Principles of Internal Medicine*. 16<sup>th</sup> ed. New York: McGraw-Hill 2003.p.1880-90.
3. Ballinger AB, McHugh M, Catnach SM, Alstead EM, Clark ML. Symptom relief and quality of life after stenting for malignant bile duct obstruction. *Gut* 1994;35:467-70.
4. Smith AC, Dowsett JF, Russell RC, Hatfield AR, Cotton PB. Randomized trial of endoscopic stenting versus surgical bypass in malignant low bile duct obstruction. *Lancet* 1994;344:1655-60.
5. Speer AG, Cotton PB, Russell RC, Mason RR, Hatfield AR, Leung JW, et al. Randomized trial of endoscopic versus percutaneous stent insertion in malignant obstructive jaundice. *Lancet* 1987;2:57-62.
6. Speer AG, Cotton PB, MacRae KD. Endoscopic management of malignant biliary obstruction: stents of 10 French gauges are preferable to stents of 8 French gauge. *Gastrointest Endosc* 1988;34:412-7.
7. Davids PH, Groen AK, Rauws EA, Tytgat GN, Huibregtse K. Randomized trial of self-expanding metal stents versus polyethylene stents for distal malignant biliary obstruction. *Lancet* 1992;340:1488-92.
8. Knyrim K, Wagner HJ, Pausch J, Vakil N. A prospective, randomized, controlled trial of metal stents for malignant obstruction of the common bile duct. *Endoscopy* 1993;25:207-12.
9. Lammer J, Hausegger KA, Fluckiger F, Winkelbauer FW, Wilding R, Klein GE, et al. Common bile duct obstruction due to malignancy: treatment with plastic versus metal stents. *Radiology* 1996;201:167-72.
10. Prat F, Chapat O, Ducot B, Ponchon T, Pelletier G, Fritsch J, et al. A randomized trial of endoscopic drainage methods for inoperable malignant strictures of the common bile duct. *Gastrointest Endosc* 1998;47:1-7.
11. Tham TC, Carr-Locke DL, Vandervoort J, Wong RC, Lichtenstein DR, Van DJ, et al. Management of occluded biliary wallstents. *Gut* 1998;42:703-7.
12. Mauro MA, Koehler RE, Baron TH. Advances in gastrointestinal intervention: the treatment of gastroduodenal and colorectal obstructions with metallic stents. *Radiology* 2000;215:659-69.
13. Feretis C, Benakis P, Dimopoulos C, Manouras A, Tsimbloulis B, Apostolidis N. Duodenal obstruction caused by pancreatic head carcinoma: palliation with self-expandable endoprotheses. *Gastrointest Endosc* 1997;46:161-5.
14. Roche SP, Kobos R. Jaundice in the adult patient. *Am Fam Physic* 2004;69:299-304.
15. Modolell I, Guarner L, Malagelada JR. Vagaries of clinical presentation of pancreatic and biliary tract cancer. *Ann Oncol* 1999;10:82-4.
16. Singh N, Gayowski T, Wagener MM, Marino IR. Vulnerability to psychologic distress and depression in patients with end-stage liver disease due to hepatitis C virus. *Clin Transplant* 1997;11:406-11.
17. Ewusi-Mensah I, Saunders JB, Wodak AD, Murray RM, Williams R. Psychiatric morbidity in patients with alcoholic liver disease. *Br Med J [Clin Res Ed]* 1983;287:1417-9.
18. Blitz NM, Rudikoff D. Pyoderma gangrenosum. *Mt Sinai J Med* 2001;68:287-97.
19. Buskila D. Hepatitis C-associated arthritis. *Curr Opin Rheumatol* 2000;12:295-9.
20. Pysopoulos NT, Reddy K. Extrahepatic manifestations of chronic viral hepatitis. *Curr Gastroenterol Rep* 2001;3:71-8.
21. Reisman Y, Gips CH, Lavelle SM, Wilson JH. Clinical presentation of (subclinical) jaundice-the Euricterus project in the Netherlands. United Dutch Hospitals and Euricterus Project Management Group. *Hepatogastroenterol* 1996;43:1190.
22. McNeilly AD, Macfarlane DP, O'Flaherty E, Livingstone DE, Mitić T, McConnell KM, et al. Bile acids modulate glucocorticoid metabolism and the hypothalamic-pituitary-adrenal axis in obstructive jaundice. *J Hepatol* 2010;52:705-11.
23. Kharnas SS, Sinitsyn VE, Shekhter AI, Lotov AN, Mashinskii AA, Bychenko VG, et al. Diagnostic approach in mechanical jaundice, complicated by purulent cholangitis. *Khirurgiia (Mosk)* 2003;6:36-41.
24. Garcea G, Ong SL, Dennison AR, Berry DP, Maddern GJ. Palliation of malignant obstructive jaundice. *Dig Dis Sci* 2009;54:1184-98.

---

Correspondence:

Budi Tan Oto  
Department of Internal Medicine  
Awal Bros Hospital Batam  
Jl. Gajah Mada Kavling I Batam 29422 Indonesia  
Phone: +62-778-4317777 Facs: +62-778-430777:  
E-mail: budi\_tan\_oto@yahoo.com

---