

## Evolution of cholestasis after ERCP are plastic stents better in cholangitis?

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### Abstract

Endoscopic Retrograde Cholangial-Pancreatography (ERCP) combine endoscopy and fluoroscopy for the diagnosis and, above all, treatment of biliary-pancreatic disorders, particularly obstructive jaundice of the bile ducts.

The resolution of jaundice/ decrease of cholestasis after ERCP is a marker of treatment efficacy, but only few studies have examined the kinetic of cholestasis.

The aim of our work is to study the evolutionary kinetics of cholestasis after ERCP.

**Keywords:** ERCP; Cholestasis; Biliary Obstruction; Kinetic

### 1. Introduction

ERCP is a key diagnostic and therapeutic tool for biliary and pancreatic disorders, particularly in the management of obstructive jaundice. While ERCP effectively relieves biliary obstruction, few studies have evaluated the kinetics of cholestasis resolution following the procedure. This study aims to analyze the evolution of cholestasis markers in patients after ERCP to assess treatment efficacy.

### 2. Methods

This is a prospective descriptive study conducted in the gastroenterology department of University Hospital, over a period of 18 months.

It included all patients admitted for obstructive cholestatic jaundice who had undergone ERCP, and we excluded cases of failed VBP catheterization and patients lost to follow-up. We analyzed the cholestasis kinetics of patients after one week of ERCP based on bilirubin determination. We noted age, sex, indication, type of prosthesis and evolution after ERCP.

### 3. Results

During this period, as shown in table 1, 50 ERCPs were performed, of which 27 were included in the study.

The mean age of our patients was 58 years, with extremes ranging from 42 to 85 years. The sex ratio (M/F) was 1.14. The main indication for ERCP was anticharities due to pancreatic head tumor in 11 patients (40.7%), lithiasis

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anticharities in 9 patients (33.3%), and anticharities due to biliary tract tumor in 7 patients (25.9%). Drainage was performed urgently in all 27 patients.

**Table 1** Cohort characteristics

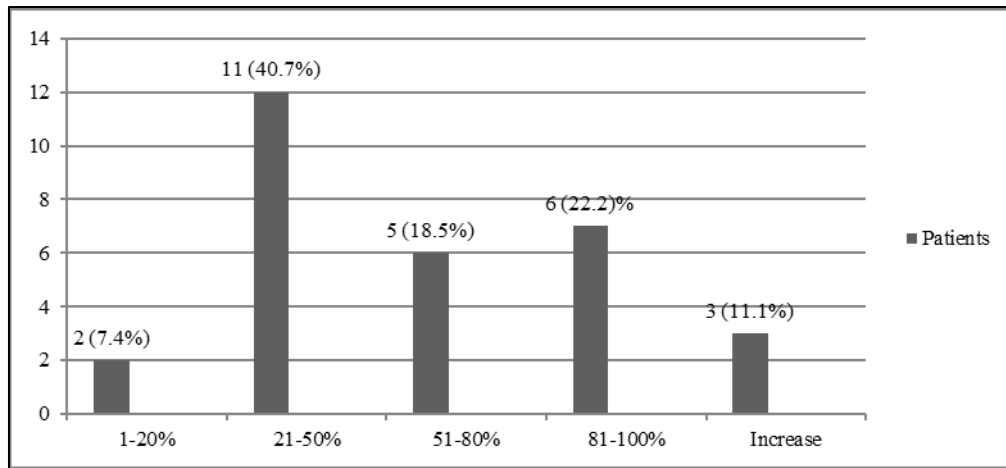
Characteristics	Values
Total number of ERCPs performed	50
ERCP included in the study	27
Average age (years)	58 (42 - 85)
ERCP indications:	
- Anticharities due to pancreatic tumor	11 (40,7 %)
- Lithiasis anticharities	9 (33.3 %)
- Anticharities due to biliary tumor	7 (25.9 %)
Completion time	
- Emergency	27 (100 %)



**Figure 1** Cholangiogram showing common bile duct stones

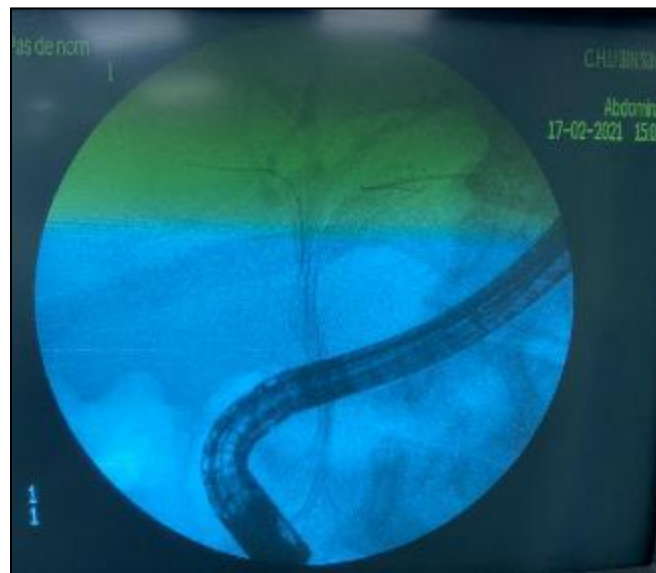
Drainage by biliary stent alone was performed in 18 patients (66.7%), and drainage by double biliary and pancreatic stent in 3 patients (11.1%). Plastic stent was used in 11 patients (40.7%) and metal stents in 10 (37%). Lithiasis extraction was performed in 9 patients (33.3%).

The evolution of cholestasis showed a decrease in 84% of cases, an increase in 6%, and was stationary in 10% (graphic 1).

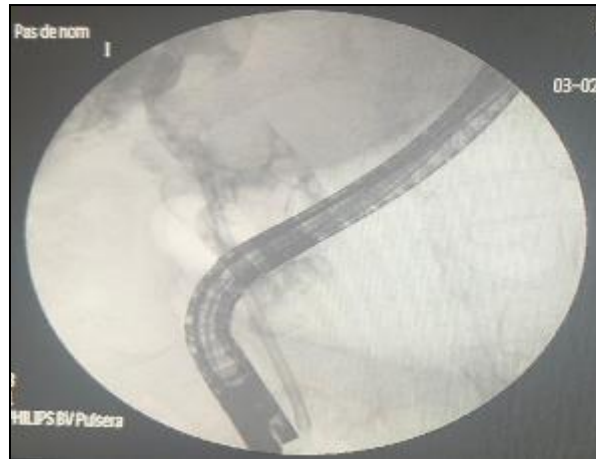


**Figure 2** Bilirubin decrease by percentage after 1 week

A decrease between [[1-20%]] chez 2 patients (7.4%), a decrease between [[21-50%]] in 11 patients (40.7%), a decrease between [[51-80%]] in 5 patients (18.5%) and a decrease between [[81-100%]] in 6 patients (22.2%) (Including 3 (50%) with lithiasis anticharities, 2 (33.3%) anticharities on pancreatic head tumor, and 1 (16.6%) anticharities on cholangiocarcinoma), while 3 patients (11.1%) showed an increase in cholestasis (+37% increase in cholestasis in 2 metastatic cholangiocarcinoma's, despite good drainage with metal prostheses).



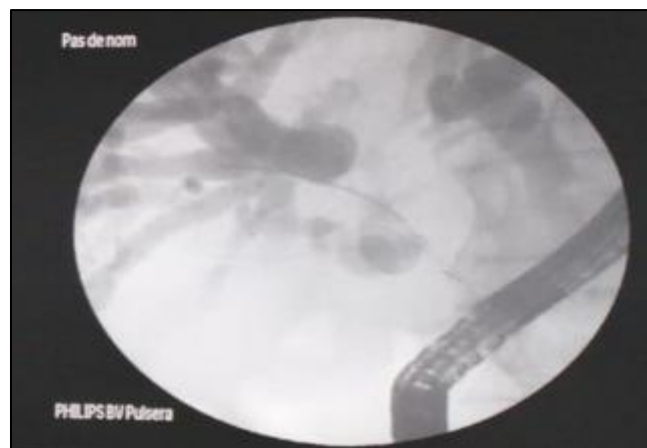
**Figure 3** Cholangiogram showing placement of two metal biliary prostheses in a patient with Bismuth IIa cholangiocarcinoma



**Figure 4** Placement of a plastic biliary prosthesis in a patient with cholangitis on choledochal stone formation with severe coagulation disorder

Plastic prostheses showed greater reductions in cholestasis, up to 96%, with a mean of 66%. In contrast, metal prostheses showed more modest reductions, with an average of 37%.

The percentage drop in cholestasis was greater in the case of lithiasis pathology, with a drop of over 81% in initial cholestasis values, followed by pancreatic head tumors with a 49% drop, and finally a drop of no more than 45% in cholangiocarcinoma's.



**Figure 5** Cholangiography showing dilation of the intrahepatic bile ducts upstream of a process of the head of the pancreas

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#### 4. Discussion

At present, ERCP is mainly used as a therapeutic approach to relieve obstruction of the bile or pancreatic ducts and, consequently, reduce cholestasis (1).

Only Few studies have focused on measuring time necessary to notice bilirubin decrease and jaundice disappearance, which remains a major criterion of efficacy.

In our study, we found that all ERCP procedures were performed on an emergency basis, for angiocholitis, which concurs with the results of Enochsson (2), where 66% of ERCPs were indicated on an emergency basis. Our data also show that 40.7% of patients had angiocholitis on a pancreatic head tumor, reflecting the importance of this pathology in our practice.

In our study 70% of patients had stent placement, all for tumor pathologies, which is in line with current recommendations (9). We used plastic stents (image 1) in 53% of cases and metal stents (image 2) in 47%, a choice influenced by the palliative or curative indication, but also sometimes by the high cost and limited availability of metal stents.

Studies by Conway et al (4) and Sangchan et al (6) report high success rates with plastic stents, but also show that metal stents are preferable in malignant cases.

In our study, plastic stents led to a more rapid decrease in bilirubin levels in the first week after ERCP, with an average decrease of 66%, compared with 37% for metal prostheses. This difference may be explained by the physical properties of the stents: plastic stents, although subject to more rapid occlusion by sludge or infection, offer immediate and effective drainage. Conversely, metal stents, renowned for their durability and prolonged permeability, require some time to fully expand, often several days, in order to reach their optimal diameter, which could limit their initial effectiveness. (9)

This raises an important clinical question regarding the optimal choice of stent type in the management of stage III cholangitis, where urgent and effective biliary drainage is critical to patient outcomes. Stage III cholangitis, characterized by severe infection and systemic signs of sepsis, demands rapid resolution of bile duct obstruction to prevent further deterioration and complications.

Our findings suggest that plastic stents, due to their immediate patency and ability to provide prompt bile flow restoration, may be better suited for such urgent scenarios compared to metal stents.

While metal stents are valued for their longer-term patency and resistance to occlusion, their inherent need for gradual expansion to reach full diameter limits their immediate drainage capacity. This delay in full functionality may be suboptimal in the acute setting of severe cholangitis, where every hour counts to reduce bile duct pressure and control infection.

Therefore, plastic stents could offer a practical advantage in providing faster relief of cholestasis in critically ill patients with stage III cholangitis, potentially leading to quicker clinical improvement and reduced morbidity.

However, this must be balanced against their known limitations, including higher rates of occlusion and the need for more frequent replacements.

This insight underscores the necessity for a tailored approach in stent selection, prioritizing immediate drainage efficiency in emergency cases of severe cholangitis, while considering metal stents for longer-term palliation once the acute phase has been controlled. Further prospective studies focusing specifically on stent performance in different cholangitis stages are warranted to better guide clinical decisions.

This observation underlines the value of longer-term follow-up, beyond one week, to fully assess the performance of metal stents, which may show more favorable results over time. This confirms the importance of personalizing the choice of stents type according to the clinical context and therapeutic objective.

Our results show a mean cholestasis reduction of 81% for biliary lithiasis, compared with 49% for pancreatic head tumors and 45% for cholangiocarcinomas. This difference can be explained by the mechanical nature of the obstruction in lithiasis, where stone removal results in immediate resolution of the biliary obstruction, whereas in tumor pathologies, drainage is often impeded by infiltration or malignant stenosis, requiring more time for significant improvement (9).

The mean reduction of 49% observed in our study for pancreatic head tumours is lower than that reported by Yuji Sakai et al (7), who documented a reduction of 84.9%, but over a median period of 21 days, much longer than the one-week follow-up in our study. This difference can be explained by the time lag and the use of metal prostheses in their study. Although these stents require time to reach their optimal diameter, they become more effective over the long term, which could explain the more marked improvement observed after 21 days.

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## 5. Conclusion

Our study shows that ERCP leads to a significant reduction in cholestasis, with a more rapid decrease during the first week observed in patients treated with plastic prostheses compared with those treated with metal prostheses.

Biliary lithiasis showed a more marked improvement than malignancy, due to the mechanical nature of the obstruction.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### *Statement of informed consent*

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

### *Author contributions*

All authors have contributed to the conduct of this work. All authors also declare that they have read and approved the final version of the manuscript

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