

# How should a therapeutic strategy be constructed for acute cholecystitis after self-expanding metal stent placement for malignant biliary obstruction?

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See “The feasibility of percutaneous transhepatic gallbladder aspiration for acute cholecystitis after self-expandable metallic stent placement for malignant biliary obstruction: a 10-year retrospective analysis in a single center” by Akihisa Ohno, Nao Fujimori, Toyoma Kaku, et al., on page 784–792.

Plastic stents or self-expandable metallic stents (SEMS) are used for drainage therapy for malignant biliary obstruction (MBO). Several reports have shown that SEMS are superior to plastic stents in terms of patency duration. Diseases that cause MBO include pancreatic cancer, cholangiocarcinoma, liver cancer, and liver metastases, and the prognosis of MBO varies greatly depending on the causative disease. With advances in diagnostic imaging, many attempts to achieve early diagnosis have been reported, and the number of cases diagnosed at an early stage has been increasing. Furthermore, advances in chemotherapy have improved the prognosis prolonged the survival of patients with these diseases.

Therefore, reintervention for stent occlusion is necessary in many cases of MBO.<sup>1,2</sup> Uncovered SEMS cannot be removed during reintervention; therefore, covered SEMS, which can be removed, are recommended. However, using covered SEMS in-

crease the risk of acute cholecystitis (AC) or acute pancreatitis because its membrane obstructs the cholecystic or pancreatic duct opening.<sup>3</sup> Nevertheless, in practice, AC has been reported with the use of uncovered SEMS.

The treatment strategy for AC after SEMS placement in patients with MBO differs from that for AC due to gallstones or other causes. Surgical cholecystectomy is usually recommended as the first-line treatment for AC.<sup>4</sup> However, in cases of unresectable MBO, many patients have various factors that make surgery infeasible, including advanced age, poor respiratory function, and multiple antithrombotic medication administration.

Therefore, few patients meet the indication for surgical cholecystectomy for AC after SEMS placement, and cholecystic drainage is indicated. There are several methods of gallbladder drainage for AC: percutaneous transhepatic gallbladder drainage (PTGBD), percutaneous transhepatic gallbladder aspiration (PTGBA), endoscopic trans-papillary gallbladder drainage (ETGBD), and endoscopic ultrasonography-guided gallbladder drainage (EUS-GBD).

ETGBD is an endoscopic retrograde cholangiopancreatography-related procedure in which a drainage tube is placed into the gallbladder via the cholecystic duct in a trans-papillary fashion.<sup>5</sup> Although much has been reported regarding the usefulness of this technique, it is generally difficult to perform due

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to the many variants of cholecystic duct anatomy.

Furthermore, the difficulty of ETGBD for AC further increases after SEMS placement. First, guidewire placement is complicated in cases in which the tumor obstructs the cholecystic duct. Second, if a SEMS is inserted, access to the cholecystic duct is impossible, particularly if a covered SEMS is inserted. In addition, if postoperative pancreatitis, a complication of endoscopic retrograde cholangiopancreatography, develops, it will be complicated by AC, further increasing the risk of serious complications.<sup>6</sup>

EUS-GBD is a technique for placing a drainage tube into the gallbladder via the gastrointestinal tract, using EUS images for guidance, and its usefulness has been widely reported.<sup>7</sup> In recent years, attempts have been made to minimize bile leakage complications using thinner puncture needles and guide wires.<sup>8</sup> However, EUS-guided drainage, including EUS-GBD, is not yet a procedure that can be performed in all facilities.

PTGBD and PTGBA are percutaneous transhepatic approaches to the gallbladder guided by transabdominal ultrasound rather than EUS and are the next recommended drainage techniques for AC after emergency surgery.<sup>4</sup> PTGBD, and PTGBA, rather than ETGBD and EUS-GBD, are the recommended drainage techniques for AC after SEMS placement in patients with MBO and are often selected in actual clinical practice.

Ohno et al.<sup>9</sup> reported the usefulness of PTGBA as a drainage therapy for AC after SEMS placement in patients with MBO. In this retrospective study, 401 patients with MBO underwent SEMS insertion, and 10.7% (43/401) developed AC after the procedure. Of these 43 patients, 37 underwent PTGBA as the initial drainage therapy. The clinical efficacy of PTGBA was evaluated by defining a good response as an improvement in at least two or three of the clinical features of AC (fever, abdominal pain, and leukocytosis) without recurrence for at least 30 days after performing PTGBA. Patients who achieved clinical improvement with a single session of PTGBA were classified as good responders and those who required two or more sessions were classified as poor responders. The results showed that the significant risk factors for AC after SEMS placement were cystic duct obstruction ( $p < 0.001$ ) and covered SEMS use ( $p < 0.001$ ).

It has been reported that obstruction of the cholecystic duct in MBO induces AC after SEMS placement; a similar trend was observed in this study. Furthermore, covered SEMS placement has also been associated with the occurrence of AC, and the results of this study were similar.

However, some biases existed in this study, and the results

should be interpreted with caution. In this study, the type, thickness, and length of SEMS used were selected at the discretion of each endoscopist. In clinical practice, the appropriate SEMS is chosen based on the length and shape of the stenosis and diameter of the bile duct dilatation. This bias is unavoidable because this was a retrospective study. However, it is dangerous to assume that all covered SEMS use can increase the risk of AC because the characteristics of SEMS vary widely, including differences in axial and radial forces. In addition, the fact that uncovered SEMS was a significant treatment resistance factor for PTGBA is equally difficult to interpret. The small number of AC cases ( $n=10$ ) after uncovered SEMS placement may also have influenced this result.

Furthermore, it should be noted that only one session of PTGBA was allowed in this study. The main advantage of PTGBA is the high quality of life of the patient, as it does not require placement of an extracorporeal tube, which is mandatory for PTGBD. However, its drainage capacity is inevitably smaller than that of PTGBD, in which the drainage tube is left in place.<sup>10</sup>

Therefore, many institutions perform at least one additional session of PTGBA for patients who do not respond after one session of PTGBA. Thus, one way of thinking about the usefulness of PTGBA for AC is to consider the therapeutic effect of one or two PTGBA sessions as the therapeutic effect of PTGBA in the long term. If this definition were used in the present analysis, it would be interesting to evaluate whether uncovered SEMS could have been a factor in resistance to treatment, although it would be expected that choledochal duct invasion would still have been a significant factor in resistance to treatment.

Nevertheless, the significance of this study and its conclusions remains useful in real-world clinical practice. The conclusion of this paper that “PTGBA can be a good option for AC after MS placement, especially in patients with coated MS,” is a clinically helpful key message. We hope that a prospective multicenter study will be conducted in the future to unify the details of the PTGBA procedure and to clarify its usefulness.

### Conflicts of Interest

Mamoru Takenaka is currently serving as an associate editor of Clinical Endoscopy; however, he had not involved in the peer reviewer selection, evaluation, or decision process of this article. The authors have no potential conflicts of interest.

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