

# Intraductal radiofrequency ablation of tumour ingrowth into an uncovered metal stent used for inoperable cholangiocarcinoma

KL Lui 呂家聯  
KK Li 李建綱

A 91-year-old woman diagnosed to have an inoperable cholangiocarcinoma had an uncovered metal stent inserted for palliative drainage. About 1.5 years later, tumour ingrowth into the metal stent caused cholangitis. Intraductal radiofrequency ablation was applied to create local coagulative tumour necrosis and the necrotic tissue was removed via a balloon catheter. A plastic stent was inserted to empirically treat any ensuing potential bile duct injury. The patient was discharged without complication with good palliative drainage. Intraductal radiofrequency ablation is a new technique for the treatment of metal stent occlusion due to tumour ingrowths. This is the first case report of this relatively safe and feasible new technique for the treatment of tumour ingrowth into a metal stent used as palliation for malignant biliary obstruction.

## Introduction



A video of intraductal radiofrequency ablation of tumour ingrowth into an uncovered metal stent is available at <[www.hkmj.org](http://www.hkmj.org)>.

Stainless steel self-expandable metal stents (SEMSs) are the standard for palliative relief of malignant biliary obstruction in patients with a life expectancy longer than 3 months.<sup>1,2</sup> However, problems that limited the durability of SEMSs included tumour ingrowths, biofilm formation, and sludge. Intraductal radiofrequency ablation (RFA) was a new technique for treatment of tumour ingrowth into such SEMSs. The technique has been used to deal with hepatocellular carcinoma-related obstruction for a long time, but there was only very limited experience of its use in malignant biliary obstruction.<sup>3,4</sup>

## Case report

A 91-year-old woman was admitted to the medical unit due to fever about 30 months after she was diagnosed to have cholangiocarcinoma in November 2009. Originally she had presented with painless obstructive jaundice and subsequent endoscopic retrograde cholangiopancreatography (ERCP) showed that there was a 2-cm irregular stricture at the distal common bile duct (CBD) and biopsy confirmed it to be cholangiocarcinoma. Due to her advanced age, the surgical team had opted for conservative management.

About 4 months after her carcinoma was diagnosed, an uncovered metal stent was inserted into the CBD for palliation. The jaundice subsided after the stent insertion and she remained asymptomatic till June 2011. About 15 months later she had an episode of cholangitis and repeat ERCP showed tumour ingrowth at the lower end of the CBD. A plastic stent was therefore inserted for drainage. Since that time she underwent elective plastic stent exchange every 3 months but had no other symptoms till her current admission.

During her latest admission, physical examination revealed that she was febrile and had jaundice. Laboratory tests yielded an elevated serum bilirubin level of 51  $\mu\text{mol/L}$  (reference level, <19  $\mu\text{mol/L}$ ) and alkaline phosphatase of 958 U/L (reference range, 56-119 U/L). An ERCP showed that there was tumour ingrowth with sludge, more severe at the lower end of the CBD. The sludge was flushed with normal saline and another plastic stent was inserted for drainage. In view of the severe tumour ingrowth (enough to cause yet another episode of cholangitis), an elective ERCP for intraductal RFA to deal with the problem of tumour ingrowth into the metal stent was opted for.

The ERCP was performed using a standard Olympus TJF 260 duodenoscope (Olympus, Hong Kong). The previously inserted plastic stent was removed. At this elective ERCP, a baseline cholangiogram showed that the tumour ingrowth had extended from the mid to the distal CBD, being especially severe at the distal end (Fig 1a). The RFA catheter was put in place with the tumour ingrowth between its two electrodes (Fig 1b). A 10 W electric current was applied to the distal CBD tumour ingrowth for 2.5 minutes and for 90

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Department of Medicine and Geriatrics,  
Tuen Mun Hospital, Tuen Mun,  
Hong Kong  
KL Lui, MMedSc, FHKAM (Medicine)  
KK Li, FRCP, FHKAM (Medicine)

Correspondence to: Dr KL Lui  
Email: [klluitc@yahoo.com.hk](mailto:klluitc@yahoo.com.hk)

## 替不能接受手術的膽管癌患者進行導管射頻消融以醫治其已生入金屬支架的腫瘤

一名91歲膽管癌患者因不能接受手術而安裝一金屬支架以助排水。一年半後，腫瘤細胞生長入金屬支架而導致膽管炎。為病人進行導管射頻消融來製造局部的凝固腫瘤壞死細胞，然後通過球囊導管移走壞死組織，並按經驗插入塑料支架以避免可能發生的膽管損傷。病人無併發症及排水良好，其後出院。導管射頻消融術是一種新技術，用於治療腫瘤向內生長以致金屬支架閉塞的情況，是一種相對安全和可行的新技術。本文為首宗關於使用導管射頻消融術治療腫瘤長入金屬支架而引致惡性膽管梗阻的報告。

seconds to the mid CBD tumour ingrowth. This was followed by balloon extraction of necrotic tumour tissue by flushing with 100 mL normal saline. The follow-up cholangiogram showed no more tumour ingrowth (Fig 2). A plastic stent was inserted after further adequate flushing with normal saline. The patient was discharged without complications the next day. Biliary drainage was good as evidenced by the patient's improving liver function test results. She suffered another episode of biliary occlusion 2 months after the RFA, which was successfully managed with reinsertion of another plastic stent that achieved satisfactory biliary drainage till the patient died half a year later.

## Discussion

Intraductal RFA can be performed by standard duodenoscopy (with a 3.2-mm working channel). The RFA catheter probe is 1.8 m long, 8 Fr (2.6 mm) in diameter, and allows 0.035-inch guidewires to pass through. There were two ring electrodes at the RFA probe (8 mm apart); the distal electrode was 5 mm from the leading edge. A 2.5-cm length of local coagulative necrosis can be attained. Energy was delivered by a RFA generator that delivered electric energy through the two electrodes at 10 W for 1.5 mins at 400 kHz with a 1-min cool-down period. Some experts advise placing either plastic or metal stents after RFA to empirically treat any resulting bile duct injury.<sup>5</sup> Their use in malignant biliary obstruction was already approved by the US Food and Drug Administration and EU European Conformity guideline.

Sepsis, cholecystitis, and pancreatitis after intraductal RFA have all been reported. It was

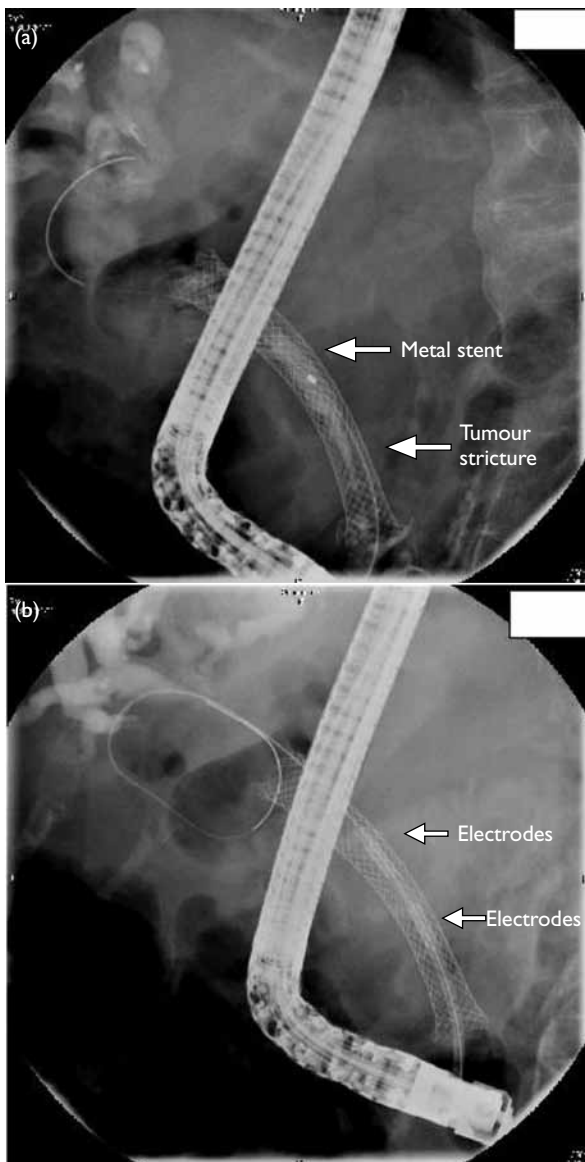


FIG 1. (a) Severe tumour ingrowth over the distal common bile duct, and (b) radiofrequency ablation catheter within the tumour ingrowth in between two electrodes

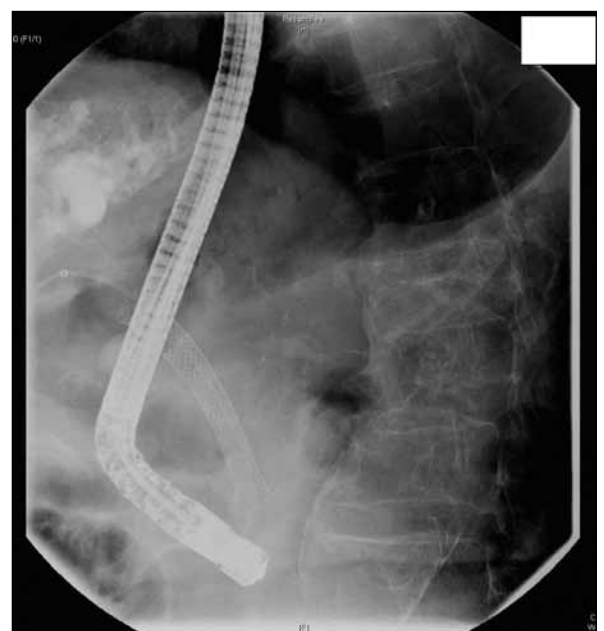


FIG 2. No tumour ingrowth in follow-up cholangiogram

postulated that the RFA may cause bile duct injury and increase the risk of bacterial translocation.<sup>5</sup> Direct electrical injury could be another possibility, since intraductal RFA can cause deeper tissue damage by coagulation necrosis than other lumenally (eg in Barrett's oesophagus), which only gives rise to an approximately 700 nm superficial burn. In the bile duct, the coagulative necrosis can be up to 3 mm but is minimised by the use of two electrodes that spread the energy over a larger area.<sup>5,6</sup> Thus, RFA does have the potential to cause damage to structures adjacent to the bile duct.

We are unaware of any previous case report describing the use of intraductal RFA in this situation, other than one retrospective study from United

Kingdom in 2011.<sup>5</sup> This UK study described 21 patients with malignant biliary obstruction, in whom RFA was applied and SEMSs introduced thereafter. The median diameter at the strictures improved from 0 mm to 4 mm. All these patients had patent metal stents 30 days after RFA and more than 75% retained stent patency for more than 90 days. Therefore, repeated RFA procedures may be considered every 1 to 3 months. More prospective studies are necessary, however, to provide longer-term efficacy data and comparison with other modalities of treatment (eg placement of other SEMSs). Notwithstanding these observations, incorporation of this new technique into the standard palliative management of patient with dysfunction SEMSs due to tumour ingrowth appears to be a genuine advance.

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