

The impact of cholangioscopy on radiation exposure in ERCP

Noor Bekkali¹, A Bhagwanani², M Chouhan², MG Keane¹, GJ Webster¹

¹Pancreatobiliary and ²Radiology departments, University College London

Background

Endoscopic retrograde cholangio-pancreatography (ERCP) remains the standard tool for biliary stone extraction, biliary drainage and intraductal stricture assessment. Cholangioscopy allows direct intraductal visualisation without requiring fluoroscopy. Therefore, the aim of this study was to assess radiation dose during ERCP in patients with stones or strictures with or without cholangioscopy.

Methods

Data from patients referred for cholangioscopy between June 2015 and December 2016, for difficult biliary stones (following failed stone extraction with conventional ERCP), or to acquire tissue diagnosis for indeterminate strictures was prospectively collected. In all patients with stones, first conventional ERCP was attempted, using mechanical lithotripsy and or sphincteroplasty combined with balloon trawls before cholangioscopy was attempted. Radiation exposure was indirectly measured using total dose area product (DAP) measured in Gray per square cm (mGy/cm^2). Continuous variable differences were assessed using Student t-tests.

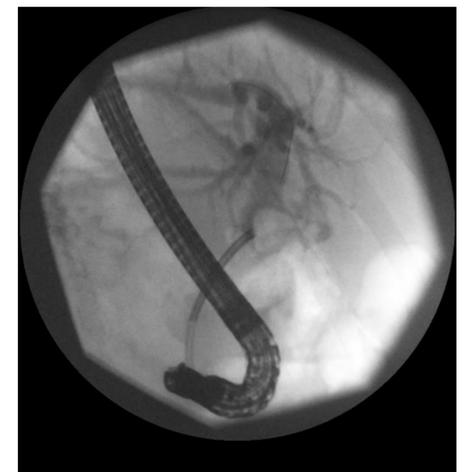
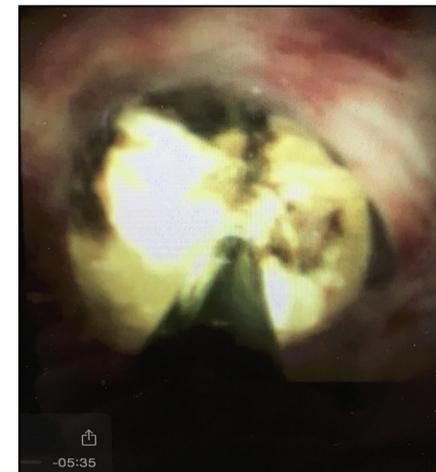
Results

A total of 194 patients, mean age 62 ± 18 years [48% male] were included based on intention to undergo cholangioscopy. Indications comprised: 128 with stone disease, 56 strictures, 7 stone & stricture and 3 'other'. Conventional ERCP for stone clearance sufficed for 29 (23%) patients without cholangioscopy (group I); 1 patient had conventional ERCP for a stricture. Cholangioscopy was needed in 99 (77%) patients (group II) for stones and 55 (98%) patients referred for strictures (group III).

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Results- II

The mean DAP in group I was 851 ± 661 compared to 1912 ± 1817 mGy/cm^2 in group II; $p=0.003$. Radiation dose for conventional ERCP radiation for stones was comparable to the dose (857 ± 921 mGy/cm^2) needed for stricture assessment for group III; $p=0.98$. The mean duration of the procedure (minutes) was 48 ± 20 in group I, vs 72 ± 27 in group II; $p=0.0001$. For strictures necessitating cholangioscopy, 49 ± 19 minutes were needed for assessment which was comparable to group I; $p=0.92$. Radiation dosages per minute were persistently higher in group I compared to group II; 17 ± 12 vs 29 ± 24 $\text{mGy}/\text{cm}^2/\text{min}$ ($p=0.02$). As only 1 patient had stricture not necessitating cholangioscopy, no comparison was made between group III for above findings.



Conclusion

Cholangioscopy for stones adds considerably to procedure duration and total radiation dose compared to ERCP alone for stone disease. This likely reflects the high complexity of stone cases necessitating cholangioscopy. Of note, the radiation exposure/minute for ERCP with cholangioscopy in stone disease is no different to conventional ERCP. Our data on cholangioscopy in stricture assessment suggests that this may enhance diagnostic information (i.e. direct visualisation) without adding procedure time or radiation exposure.