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Predicting the ease of selective common bile duct cannulation and extent of sphincterotomy during ERCP using a novel endoscopic classification of major duodenal papilla morphology ([1]Joint first authors)

During ERCP (Endoscopic Retrograde Cholangiopancreatography), endoscopists make an initial assessment of major duodenal papilla (MDP) morphology to determine the optimal approach for common bile duct (CBD) cannulation and a safe limit for sphincterotomy. In the absence of recognised descriptors for papillary morphology, a novel classification based on increasing prominence of the MDP was devised after analysing 100 videos of successful cannulation in patients who had provided consent for research. Four types were defined: I, flat (biliary epithelium in continuity with duodenal wall); II, prominent (an elevated papilla with an anulus of papillary epithelium); III, infundibular (an infundibulum present with its lateral edges tethered to the duodenal wall); IV, dependent (distended infundibulum and mobile papilla). This system was assessed in a validation exercise with 40 University of Cambridge medical students. The sensitivities of their responses demonstrated the reproducibility of the system and suggested a requirement to refine the definition for Type III. During ERCP, selective CBD cannulation requires initial engagement followed by an angular adjustment (step angle) to attain deep cannulation, a pre-requisite for sphincterotomy. Dissection of 27 cadaveric specimens from donors whose consent had been obtained for research under the Human Tissue Act 2004, showed an increasing mean step angle from Types I to IV, with this adjustment being significant in Types II and III ($P<0.05$). Prediction of the angular adjustment required using MDP morphology could therefore facilitate deep cannulation and sphincterotomy. Intramural CBD length was also shown to increase with Type: Type I (3.7 ± 1.9mm), Type II (6.6 ± 2.7mm), Type III (9.8 ± 1.9mm) and Type IV (12.5 ± 1.7mm). These findings corroborate the progressive nature of the novel classification system, while also demonstrating the differing limits to which sphincterotomy can be safely extended. Our results support a need for further study to explore the relationship between MDP morphology and efficacy of endoscopic biliary intervention.