To the Editor:

We read with great interest the recent article by Haraldsson et al [1] and agree with Alder, in the accompanying editorial [2], 'that a uniform and universally accepted language to describe the papilla itself does not exist'. Our group has also been working on a papillary morphological classification scheme with emphasis on the anatomical significance of the different types [3]. Like Haraldsson, we do not consider the proximity of papillae to diverticula or hooding folds; our focus has been on the length of the intraduodenal portion of the bile duct and the change in angle between this segment and the retroperitoneal bile duct (step angle). We believe these parameters may influence success in deep cannulation and the maximum safe length of sphincterotomy that can be achieved to avoid a type II (peri-Vaterian) perforation [4]. Furthermore, we consider our classification system (derived from analysis of 100 consecutive ERCP videos of normal papillae and dissection of 40 human cadaveric specimens) to be more logical than that of Haraldsson in that our sequence of types reflects increasing prominence and mobility of the papilla.

*Table 1: Type definitions and population frequencies*

| | Name | Frequency % | Description |
|---|---|---|---|
| Type I | Flat | 20 | Flat immobile papilla with predominant biliary epithelium in continuity with the duodenal wall. May have an incomplete annulus of papillary epithelium |
| Type II | Prominent | 42 | Raised immobile papilla with a clear and complete annulus of papillary epithelium surrounding the biliarv epithelium |
| Type III | Infundibular | 25 | Immobile, prominent papilla with an infundibulum. May have a traversing mucosal fold. |
| Type IV | Dependent | 13 | Mobile prominent, hanging papilla with a distended infundibulum. Bulges into the duodenum with an inferiorly facing orifice. |

However, we can use these morphological definitions to map our types to those of the Scandinavian group with reasonable concordance between the population frequencies of the different groupings. This exercise suggests that a subset of Scandinavian 'regular' papillae with prominent infundibula would be classified as type III in the Cambridge scheme.

*Table 2: Mapping between Cambridge and Scandinavian classifications*

| Cambridge scheme | Scandinavian mapping | Cambridge population frequencies % | Scandinavian population frequencies % |
|---|---|---|---|
| Type I | Types 2 (small) & 4 (ridged) | 20 | 21 (13 + 8) |
| Type II | Type 1 (regular) | 42 | 56 |
| Types III and IV | Type 3 (pendulous) | 38 (25 + 13) | 23 |

Since we have undertaken detailed measurements following dissection of the different types in cadaveric specimens, we can contribute anatomic data to the Scandinavian clinical results and address some of the queries posed by Adler.

It is surprising that the small papillae are the most difficult to cannulate, they have the shortest intramural length and smallest angular adjustment (step angle) to achieve deep cannulation. These are the 'straight shot' papillae as described by Hawes [5]. Type IV papillae, although easy for trainees

to ‘engage’ are amongst the most difficult to cannulate because of their mobility and intramural length, with pronounced angular change between ‘insinuation’ and deep cannulation, to use the terminology of Hawes.

*Table 3: Anatomical details and cannulation difficulty*

| | Cambridge | | | Scandinavian |
|---|---|---|---|---|
| | Prominence (mm) | Intramural length (mm) | Step angle (degrees) | Difficult cannulation % |
| Type I | 0.42 ± 0.58 | 5.53 ± 3.07 | 3.78 ± 14.74 | 49* |
| Type II | 2.47 ± 1.27 | 7.51 ± 2.64 | 10.70 ± 10.18 | 36 |
| Type III | 3.46 ± 1.42 | 9.79 ± 1.58 | 9.56 ± 12.90 | 48 |
| Type IV | 5.44 ± 0.68 | 11.19 ± 2.56 | 23.07 ± 9.76 | |

* Corrected for population prevalence of Type 2 and 4 Scandinavian papillae

Adler asks how all this information can help endoscopists during a procedure. We believe the different morphologies do provide some insight into likely cannulation difficulties, but their greatest value may be in the assessment of extent of safe sphincterotomy and requirement for sphincteroplasty. In particular, those papillae with prominent infundibula (Cambridge type III, Scandinavian ‘regular’ with infundibulum) allow for a cut, often through a traversing but not hooding fold, almost as long as the Cambridge type IV, Scandinavian ‘pendulous’ types.

It is pleasing to discover a growing interest in the classification of papillary morphologies and anticipate, in due course, the therapeutic significance will become clearer.

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