

EUS-Guided FNA for Proliferative Rate in Pancreatic Neuroendocrine Tumors: A Single Center Experience Over a 11-Year Period

Maria C Petrone, Sabrina GG Testoni, Silvia Carrara, Gianpaolo Balzano, Marco Manzoni, Claudio Doglioni, Pier Alberto Testoni, Paolo G Arcidiacono

“San Raffaele” Scientific Institute, “Vita-Salute San Raffaele” University. Milan, Italy

Context Pancreatic neuroendocrine tumors (PNTs) are rare, representing 1% to 2% of all pancreatic neoplasms. Endoscopic ultrasonography in combination with fine needle aspiration (EUS-FNA) has been shown to be an highly accurate method for the preoperative localization and diagnosis of PNTs and several studies have shown that proliferative activity index (Ki-67) represents one of the most important criteria of malignancy. **Objective** The aim of this study was to evaluate the role of EUS-FNA in the assessment of the proliferation index (Ki-67) expression on cytological material in a consecutive cohort with histologically confirmed PNT. **Methods** Data of all consecutive patients undergone EUS-FNA of pancreatic mass over a 11-year period, were prospectively stored in a data base. All cases with both cytological and histological diagnosis of PNT were evaluated for the present study. Pre-surgical FNAs' immunocytochemical results (Ki-67) were compared to the corresponding findings obtained from surgical specimens. We categorized Ki-67 expression using a cut-off of 2% (Ki-67 $\leq$ 2% and Ki-67>2%). **Results** About 2,000 pancreatic mass FNAs were performed over a 11-year period. Eighty-two patients (mean age 55.6 $\pm$ 14.3 years) had cytological diagnosis of PNT, of whom 78 had confirmed histopathology. Sensitivity of

EUS-FNA for the diagnosis of a PNT was 87.5%. The mean number of needle passes to obtain adequate sample was 2.6 $\pm$ 0.98. Proliferative index was evaluable in 35 FNAs (44.8%); in the remaining patients we could not measure Ki-67 because not enough material was left after performing routine staining. When using a cut-off of 2%, Ki-67 expression measured was concordant in 17 out of 22 and the remaining 5 cases were discordant. When using a cut-off >2%, Ki-67 expression was concordant in 11 out of 13. Overall concordance between cytological and histological samples for Ki-67 was 80% (28/35). Kappa statistics was 0.64 (95% CI: 0.25-0.83). Sensitivity and specificity of FNAs for Ki-67 were 0.79 (95% CI: 0.61-0.91) and 0.69 (95% CI: 0.48-0.83), respectively (P value=0.007). **Conclusion** It is possible to determine proliferative index in PNTs on cytological material obtained by EUS-FNAs with an overall good agreement in the expression of Ki-67 measured either on cellular material and on histological tissue. The cytological Ki-67 may effectively improve the preoperative assessment of PNTs. A careful quantitative analysis of specimens at the time of FNA should be done in order to ensure sufficient material for Ki-67 assessment.