# Pancreatic Head Mass: What Can Be Done ? Diagnosis: ERCP and EUS

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Adenocarcinoma of the pancreas ranks fourth as a cause of death in adults in the United States and is the second most common cause of death due to cancer of all the gastrointestinal malignancies [1]. Contrary to what is reported in the surgical literature, surgery is not curing many people: an extremely careful review of over eleven thousand pancreatic resections for cancer since 1935, showed that the overall 5-year survival rate in pancreatic cancer is less than 0.5% [2].

Detection methods in pancreatic cancer include a number of invasive and non-invasive diagnostic tests. We will discuss the role of endosonography and endoscopic retrograde cholangiopancreatography (ERCP) with ancillary techniques in the diagnosis of pancreatic head masses.

Endoscopy in pancreatic cancer plays both a diagnostic and a therapeutic role. ERCP is a useful diagnostic tool in pancreatic cancer, with a sensitivity equal to the combination of abdominal ultrasound (US) and computed tomography (CT) (97% ERCP vs. 99% US plus CT) [3, 4]. During an ERCP it is possible to perform a tissue sampling for cytology by means of a brushing of the stricture. The results of endobiliary brushing are not enthusiastic, with a cumulative sensitivity rate of 46% for pancreatic cancer and 68% for cholangiocarcinoma [5]. Diagnostic yield of brush cytology at ERCP is significantly better in bile duct cancer than in pancreatic cancer, since the latter initially compress the bile duct extrinsically and is unlikely to be diagnosed by brushing the epithelial surface during earlier stages of the disease. Intraductal brushing has unsatisfactory sensitivity in pancreatic cancer (30-69%). Brushing the pancreatic duct may increase diagnostic yield but duct disruption prevents passage of the brush through the tumor in more than 25% of patients [6]. Other ancillary techniques of tissue sampling at ERCP include: fine needle aspiration (FNA), which has a slightly superior sensitivity, endobiliary forceps biopsy which provides a 65% cancer detection rate and aspiration cytology on bile or pancreatic juice with largely disappointing results. It is clear that the use of standard techniques individually is sub-optimal and therefore several investigators recommend the use of a combination of different techniques [7]. It has been shown that triple tissue sampling with brush cytology, FNA and forceps biopsy can increase diagnostic accuracy from 39% when a single technique is employed to 77% with a combination of the three [8].

Studies have identified gene mutations prevalent in pancreatic cancer. Such oncogenic mutations occur in 90% of patients affected with ductal pancreatic adeno-carcinoma and can be detected in blood and in bile and pancreatic juice [9].

Tissue sampling at ERCP improves diagnostic accuracy and the quality of patient care and should be attempted ideally in all pancreatobiliary strictures. The cost-efficacy of multiple sampling methods in younger patients who are good candidates for surgery

is still uncertain, while in older patients, unfit for surgery, it may not alter the care. Furthermore, with the increased availability of endoscopic ultrasonography (EUS) for tumor staging and the performance of FNA, tissue sampling at ERCP may be required less frequently.

EUS is a reliable technique for the diagnosis and staging of cancer of the pancreas. The neoplasm appears as an irregular hypoechoic mass infiltrating the bright pancreatic parenchyma. The sensitivity of EUS (94%) for detecting pancreatic cancer is superior to US and CT scan (78% and 65%, respectively), in particular for lesions smaller than 3 cm. The specificity of EUS for differentiating benign from malignant lesions using ultrasound appearance alone is still unsatisfactory [10-12].

A recent study reported that the combination of EUS and K-*ras* analysis of pancreatic juice collected after secretin stimulation can provide an overall diagnostic accuracy of 94% [13].

The possibility of performing an EUS-guided FNA improves significantly both diagnostic and staging capability of EUS. Sensitivity of EUS-guided FNA ranges from 75% to 97%, similar to CT-guided FNA [14]. Pancreatic mass FNA is highly sensitive and specific (94-100%) also for lesions less than 3 cm in diameter. Such an extremely high specificity of EUS-guided FNA has been confirmed both on the pancreatic lesion and on the lymph nodes [14]. The FNA specimen is almost always adequate. EUS-guided FNA is safe (morbidity less than 2%) and has an influence on clinical decisions in 70% of the cases thus avoiding unnecessary surgery or additional imaging studies with a substantial cost savings [12].

As for cancer staging and the assessment of resectability, ERCP is not indicated, while EUS shows an accuracy of over 80%, with no differences between radial or linear scanning on either mass or lymph node evaluation as well as on vascular involvement [15].

EUS is extremely useful (accuracy of about 80%) in the diagnosis of portal vein and splenic vein invasion although it may be insensitive for superior mesenteric vein involvement [10]. The EUS criteria used are the size of the vessel, loss of interface and the irregular appearance of the venous wall with an accuracy of about 80%), although it may be insensitive for superior mesenteric vein involvement [10].

In patients with pancreatic cancer, if EUS is unavailable, ERCP should be performed in those patients suspected of having a malignancy but with normal or nondiagnostic CT scan and when a tissue diagnosis is required prior to surgery (e.g. neoadjuvant therapy). ERCP gives the unique opportunity of providing biliary decompression and simultaneous tissue sampling for cytology or immuno-histo-chemistry. Since it is an aggressive technique, ERCP should only be used with therapeutic intention.

EUS allows visualization of the tumor invasion into the vascular and adjacent structures, detection of lymphatic tumor spread and needle biopsies. EUS has a high sensitivity and specificity for pancreatic cancer with an overall staging accuracy superior to 80%.

EUS-guided FNA has a high sensitivity and specificity, similar to those achieved with a CT-guided FNA. EUS-guided FNA is a safe and effective method, which increases both the diagnostic and the staging capability of EUS in pancreatic cancer. The clinical importance of EUS-guided FNA is the avoidance of unnecessary surgery and additional imaging studies thus resulting in substantial cost savings.

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**Key words** Biopsy, Needle; Cholangiopancreatography, Endoscopic Retrograde; Diagnosis; Endosonography; Neoplasm Staging; Pancreatic Neoplasms; Ultrasonography

**Abbreviations** CT: computed tomography; ERCP: endoscopic retrograde cholangiopancreatography; EUS: endoscopic ultrasonography; FNA: fine needle aspiration; US: ultrasound

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