Ultrasound-guided biopsy of the pancreas: A multicenter study

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RESUMEN

Objetivo: en el seno de la Asociación de Ecografía Digestiva se decidió realizar un estudio retrospectivo multicéntrico sobre la punción-aspiración con aguja fina (PAAF) de lesiones ocupantes de espacio pancreáticas, mediante control ecográfico y por vía percutánea, con el objetivo de valorar el rendimiento de dicha técnica y poder compararla con la punción mediante ultrasonografía endoscópica.

Participantes: en el estudio han participado 10 hospitales con 222 pacientes con lesiones pancreáticas entre 8 y 120 mm, sospechosas de malignidad.

Resultados: el análisis de los resultados muestra una sensibilidad del 89%, especificidad 98%, valor predictivo positivo 99% y negativo 74%, con precisión diagnóstica global 91%. No encontramos ninguna complicación significativa.

Conclusión: la PAAF de lesiones pancreáticas por vía percutánea es alta rentabilidad diagnóstica y con pocas y leves complicaciones.

Palabras clave: Punción-aspiración con aguja fina (PAAF). Lesiones ocupantes de espacio pancreáticas. Tumor de páncreas. Punción control ecográfico.

ABSTRACT

Objective: members of ‘Asociación de Ecografía Digestiva’ decided to carry out a multicenter retrospective study on fine-needle aspiration biopsy for pancreatic space-occupying lesions under ultrasonographic guidance and via the percutaneous route in order to assess the technique’s performance versus endoscopic ultrasound-guided biopsy.

Subjects: 10 hospitals for a total of 222 patients with suspiciously malignant, 8-120-mm pancreatic lesions were included in the study.

Results: the analysis of results shows a sensitivity of 89%, a specificity of 98%, a positive predictive value of 99%, and a negative predictive value of 74%, for an overall diagnostic accuracy of 91%. No major complications occurred.

Conclusion: Percutaneous fine-needle aspiration for pancreatic lesions is highly cost-effective and has few and mild complications.

Key words: Fine-Needle aspiration. Pancreatic space-occupying lesions. Pancreatic tumor. Ultrasound guided biopsy.

INTRODUCTION

Initial fine-needle aspiration (FNA) studies in abdominal organs under ultrasonographic guidance were reported by Rasmussen and Holm in 1972 (1), but the technique became highly popular one decade later when real-time equipments were available, which led to the performance
of FNA for all abdominal organs over a short period of time (2,3). The recent development of endoscopic ultrasonography (EUS) and EUS-guided FNA for pancreatic lesions leads to ponder whether percutaneous FNA will be replaced by EUS-guided FNA, or both will become complementary in the near future. This concern is approached within Asociación de Ecografía Digestiva (AED), and a decision is made to perform a retrospective study of percutaneous FNAs as carried out in various gastroenterology units with ultrasonographic interventionist procedures.

**PATIENTS, MATERIAL, AND METHOD**

Ultrasonography Units within Gastroenterology Departments were asked to retrospectively review percutaneous pancreatic biopsies under ultrasonographic guidance. A data collection form and Excel database were designed and e-mailed to sites to be used indistinctly. Patients were enrolled from gastroenterology departments in hospitals Puerta del Mar (Cádiz), Virgen de la Arrixaca (Murcia), Clínica Virgen de la Salud (Cádiz), Universidad de Getafe (Madrid), La Paz (Madrid), San Agustín (Avilés), Ramón y Cajal (Madrid), Clínica Teknón (Barcelona), Diagnosis Médica-Cruz Blanca (Barcelona), and Virgen de la Salud (Toledo). Data collection and statistical analysis were performed using SPSS 12.0 for Windows.

In all cases, FNA was carried out under ultrasonographic guidance in real time, and 22G needles were used in 80% of cases, with 25G and 20G gauges being used for the rest (Figs. 1 and 2). Patients were fasted; platelets count was over 50,000 per microliter, and prothrombin activity over 50%. A pathologist was present at the ultrasonography room during FNAs in 157 (71%) procedures, where he or she performed a rapid staining for early sample study; no guidance was used for 65 (29%). A pathologist was usually present during the FNA procedure in 6 of all 10 study centers. Diagnosis was confirmed with surgery, necropsy, other imaging tests, and/or patient outcome.

**RESULTS**

Results from 222 FNAs performed between 1986 and 2005 in 222 patients were retrospectively reviewed. One hundred nineteen patients (54%) were males and 103 (46%), females with age ranging between 27 and 93 years, and a mean age of 63 ± 12 years. Mean age for males was younger than for women: 60 ± 12 vs. 65 ± 12 years, respectively (p = 0.006).

Toxic habits, medical history, and known clinical data are listed in table I. The primary presentation symptom was abdominal pain in over 50% of cases, followed by jaundice in 32%; both symptoms were present in 18% of cases, and 63% of patients with jaundice also had pain.

Ultrasonographic findings associated with the presence of a space-occupying lesion (SOL) are listed in table II. The common bile duct was dilated in 65 (35%), and Wirsung’s duct in 30 (14%), of 185 and 209 patients, respectively, with available data. Retroperitoneal adenopathies were seen in 25% of patients, and liver metastases in a lower percentage; when they were found, a FNA was usually performed on them; pancreatic FNA was only carried out for very small lesions, when cytology was inconclusive, or when their pancreatic origin was uncertain.
SOL size ranged between 8 and 120 mm, with a mean size of 37.5 ± 16 mm. The most commonly involved site was the head of the pancreas [146 (67%)] followed by the body [50 (23%)] and tail [21 (10%)]. Ultrasonograms displayed 163 (67%) hypoechogenic, 31 (15%) heterogeneous, 11 (5%) isoechogenic, and 6 (3%) hyperechogenic lesions. In 164 cases (79%), consistency of the lesion was solid, in 22 (10%) fluid, and in 23 (11%) both, solid and fluid (Table III).

The material obtained was sufficient for cytology in 202 (91%) patients, and its collection failed in 20 (9%). The findings from all 222 FNAs are listed in table IV. The false positive result reported in this series took place in 1993, when both ultrasonographists and pathologists still had little experience with the technique; cytology considered it a carcinoma, and the final true diagnosis was chronic pancreatitis.

FNA was performed on 22 SOLs with fluid consistency (data known for 209 cases); in two of them (10%), cytology demonstrated malignancy. These results suggest that overall diagnostic accuracy was 91%, with a sensitivity of 89%, a specificity of 98%, a predictive value for positive results of 99%, and a negative predictive value of 74% (Table V).

In our series of 222 SOLs, 156 (73%) were ≥ 3 cm and 59 < 3 cm in size. Comparison between groups showed a greater proportion of inadequate samples for diagnosis among smaller lesions, 7 (12%) vs. 13 (8%), albeit this difference was not statistically significant. We also found no differences in the size between benign and malignant lesions (Table VI).

On analyzing all 17 false negative results we saw that three (18%) SOLs were smaller than 3 cm and 14 (82%) were greater than 3 cm. This difference was not statistically significant.
and this technique has some of the highest positive predictive values for different organs (6). Some studies comparing FNA biopsy to conventional-needle biopsy show that the former technique usually obtains more adequate samples for diagnosis (97 vs. 89%), and result in a higher diagnostic accuracy during cytology (78 vs. 46%). In our series, we obtained insufficient samples in 9% of cases, similar to the percentage reported in the literature (14).

FNA for cytology not only provides knowledge on the malignant nature of lesions, but also allows establishing a histological diagnosis even in rare tumors, including adenosquamous carcinoma or lymphoma (15-17).

Ten percent of pancreas cysts are tumors. In our series, 11% of cystic lesions were malignant. Up to 30% of pancreatic cystic tumors are initially treated as pseudocysts (18).

Endoscopic ultrasonography (EUS) allows to visualize and perform FNA on smaller SOLs; it is of great value in tumor staging, which includes location, invasion of neighboring organs such as the duodenal wall or vascular structures, presence of collateral circulation, and presence of paratumoral or metastatic adenopathies (19).

US-guided FNA complications are few and usually mild in nature. Mortality using a fine needle is 0.008 to 0.03%, and most common causes of death include hemorrhage, necrotic-hemorrhagic pancreatitis, and septic shock (20,21). No significant complications arose in our series.

To conclude, FNA biopsy of the pancreas under ultrasonographic guidance is highly cost-effective and still is very useful; this technique is user-friendly, and results in little discomfort for patients. EUS-FNA represents a relevant advance, as it may reach small lesions inaccessible to conventional ultrasonograms, and allows complete tumor staging.

REFERENCES

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