Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Gastroenterology

Contribution of Endoscopic Ultrasound (EUS) in Biliopancreatic Pathology: Experience of the Hepato Gastroenterology Moroccan Department

I.Elkoti[3*], N.Elfaquir[1], FZ Belabaas[1], R.Laroussi[3], Y. Charouaqui[1], I.Rahmouni[1], H.Seddik[3], A.Albouzidi[2], F.Rouibaa[1]

[1]Gastroenterology Department of the Cheikh Khalifa Hospital – Casa
[2]Pathologicalanatomy Department of the Cheikh Khalifa Hospital – Casa
[3]Gastroenterology II Department at the Mohammed V Military Hospital- Rabat

DOI: 10.36347/sjams.2022.v10i05.017 | **Received:** 09.04.2022 | **Accepted:** 14.05.2022 | **Published:** 18.05.2022

***Corresponding author:** I. Elkoti
Gastroenterology II Department at the Mohammed V Military Hospital- Rabat

Abstract **Original Research Article**

Introduction: Endoscopic ultrasound (EUS) is a method of exploration in gastroenterology, it combines ultrasound and endoscopy for the examination of the digestive tract and nearby structures. It is an ultrasound technique that allows the use of high-definition ultrasound transducers. ***Materials and methods:*** It is a descriptive retrospective study covering a period of 34 months, from 01/2019 to 10/2021. It concerned 100 patients who had endoscopic ultrasound for biliopancreatic pathology, in the and the university hospital Sheikh Khalifa. We noted the demographic, clinical and morphological data, such as transcutaneous ultrasound, abdominal CT scan and MRI as well as the EUS. The results of the EUS were compared with the imaging and histology data when performed. We were therefore able to evaluate the reliability of each examination and thus its strong and weak points. ***Results:*** The average age of our patients was 58 years, with a sex ratio: 1.05. The symptomatology was dominated by abdominal pain and jaundice, the biology by cytolysis and biological cholestasis syndrome. We noted a predominance of tumor pathology with 42% followed by inflammatory pathology: acute pancreatitis as part of the etiological assessment. The reliability of EUS in the diagnosis of pancreatic cancer is 88% with a reliability of abdominal CT of 68%. Our study also allowed us to evaluate with precision the reliability of detection of lymph node and vascular invasion of biliopancreatic cancers, which was 88%. We also noted other pathologies for which EUS was a good diagnostic tool, main bile duct stones but also cystic lesions of the pancreas. ***Conclusion:*** In view of the comparative study of these results with the other types of explorations, of which the EUS, proved to be more effective in the exploration of the pancreatic region especially in for the assessment of tumor extension and diagnosis of choledocholithiasis and characterization of cystic lesions. The EUS has a therapeutic interest in guiding drainage procedures, as well as new antitumor treatments or the neurolysis of the solar plexus.

Keywords: Endoscopic ultrasound (EUS), gastroenterology, choledocholithiasis, elastography.

INTRODUCTION

The ampullary and periampullary region is a complex anatomical crossroads, comprising the biliopancreatic confluence, the head of the pancreas, the ampulla of Vater and the second portion of the duodenum with the lower end of the main bile duct. This bilio-pancreatic crossroads is the point of convergence of many regional pathologies: complications of vesicular stones, acute or chronic pancreatitis, tumour pathology of the pancreas, duodenum or bile ducts. Endoscopic ultrasound (EUS) is a method of exploration in gastroenterology, combining ultrasound and endoscopy to examine the digestive tract and nearby structures. The development of EUS has accelerated over the last ten years, with the advent and diffusion of echo-endoscopy-guided histology, the development of endoscopic ultrasound - guided therapeutics as well as the advent of certain technological refinements such as elastography and contrast endoscopic ultrasound. The aim of our work is to evaluate the interest of endoscopic ultrasound in bilio- pancreatic pathology in comparison with other routine techniques such as surgery.

MATERIAL AND METHOD

This is a retrospective study spanning 34 months, from January 2019 to October 2021, conducted at the Sheikh khalifa ibn zayd university hospital in casablanca including 100 patients referred for bilio-pancreatic endoscopic ultrasound. We included any

patient with solid or cystic lesions of the biliopancreatic crossroads, for diagnostic or therapeutic purposes.

RESULTS

I. DESCRIPTION OF THE STUDY POPULATION:

The most represented age group is 41 to 70 years with a percentage of 73%. The average age of our population was 58.13 years with age extremes ranging from 15 to 80 years. There was a slight male predominance (n=51) in patients who had biliopancreatic endoscopic ultrasound with a sex ratio M/F: 1.05

All patients were symptomatic on admission. The most frequent reason for consultation was abdominal pain representing 40% of the patients with epigastralgia and hepatic colic, followed by jaundice (23% of our series). The other symptoms were represented by an alteration of the general state in 11% of our patients as well as an anaemic syndrome found in one patient and jaundice associated with pruritus in 3 of our patients.

In 26% of the cases the biological work-up was normal, the most frequent disturbances found were: A combination of cytolysis and cholestasis in 21% of cases, cytolysis alone in 16% and cholestasis alone in 10% of cases. Lipasemia greater than three times normal was found in 16 of our patients. Tumour markers such as CA19-9 and ACE were elevated in 9% of our population.

II. BILIOPANCREATIC ESE

Biliopancreatic EUS revealed 31 cases of pancreatic mass, 11 with adenopathy and 16 without, and 4 with distant metastases.

The prevalence of TIPMP in our series was 12% followed by 5% of cases of vesicular lithiasis, and 4% of cases of BPV lithiasis.

Tumour pathology

Pancreatic tumour

In our series we found 31 pancreatic tumours:

- Their most frequent location was the head of the pancreas with a prevalence of 52%.
- The remainder is divided between the tail of the pancreas (about 25%) and the coropreocaudal location (about 23%).

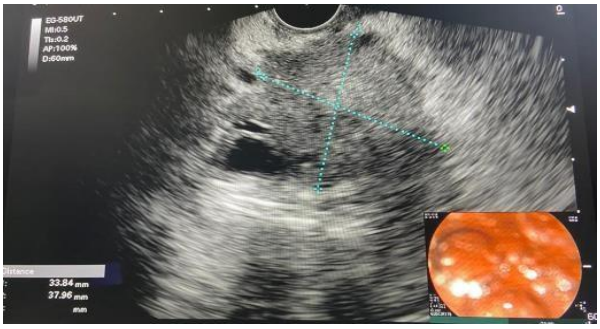

Figure 1: EUS image of the pancreatic tumour lesion

Ampulloma and biliary tract tumour

The EUS suspected 4 cases of ampullomas, 2 were classified as T4N0 with bile duct invasion, 2 others were described as degenerated ampullomas.

Figure 2: EUS image of the ampullary lesion

Cystic lesion

In our population we found 14 cases of TIPMP. Biliopancreatic EUS provided the number, size and location of TIPMPs and degeneration.

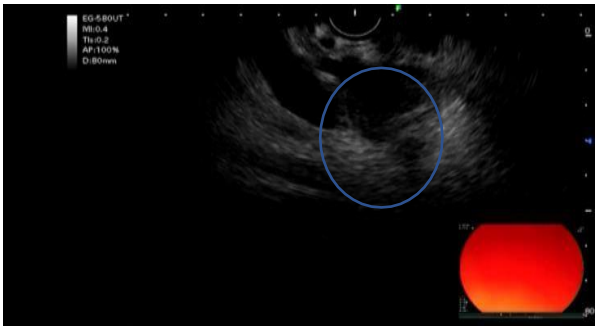

Figure 3: EUS image of a cystic lesion in the head of the pancreas

GIST

The study of our results allowed us to discover 2 GISTs, one was discovered in the context of an etiological search for recurrent acute pancreatitis, the second was being investigated for the discovery of an ulcerated lesion of the ampulla of Vater.

Figure 4: EUS image with GIST appearance

Lithiasis pathology

Figure 5: EUS image of a PBV lithiasis

Pancreatitis

EUS has never been validated in the diagnosis of acute pancreatitis. It has also not been validated in the assessment of the severity of this condition. However, EUS can be useful in making the aetiological diagnosis of acute pancreatitis when it is lithiasis or a tumour obstructing the pancreatic ducts.

Pancreatic cysts: only 1 false pancreatic cyst was diagnosed AT EUS

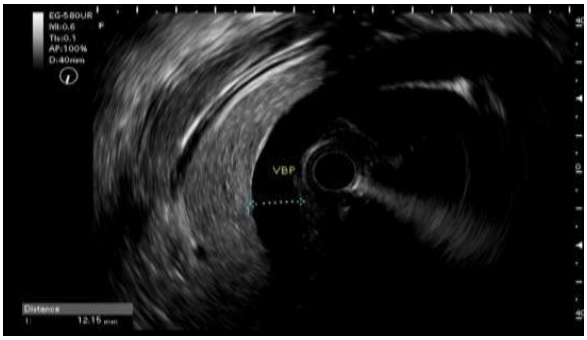

Figure 6: EUS image of VBP dilation

DISCUSSION

I. COMPARISON OF ENDOSCOPIC ULTRASOUND WITH OTHER INVESTIGATIONS IN THE LITERATURE:

1. Comparison of endoscopic ultrasound, CT and MRI for the diagnosis of tumours:

Table 1: Sensitivity and specificity of EUS, PET, AND MRI for tumor detection [1]

	EUS	PET	MRI
Sensitivity, %	98 (47/48)	87.5 (42/48)	87.5 (42/48)
Tumors <25 mm, %	100 (12/12)[a]	83 (10/12)	50 (6/12)
Tumors >25 mm, %	97 (35/36)	89 (32/36)	100 (36/36)[a]
Specificity, %	82 (9/11)	54.5 (6/11) 66.6 (6/9)[b]	91 (10/11)

BORBATH study 2005

Table 2: VOLMAR 2005 study lesion detection at EUS, CT and ultrasound [2]

	EUS	US	CT	EUS <2cm	US <2cm
PPV	99%	100%	100%	97%	100%
NPV	73%	49%	47%	88%	50%
Acc	87%	82%	82%	92%	83%

Volmar GIE 2005

All imaging modalities showed moderate to high sensitivity, specificity and accuracy. Logistic regression analysis showed that for lesions < 3 cm, the EUS method had higher accuracy than US or CT. No statistically significant difference was observed for larger lesions or for the number of needle passes.

Comparison of endoscopy and octreoscan for endocrine tumours

Table 3: Zimmer *et al*., 1996 study comparing EUS and otreoscanner [2]

	Gastrinome	Insulinome
EUS seule	**79%**	**93%**
octréoscan	**86%**	**14%**
EES + octréoscan	**100%**	**-**

Zimmer *et al*., Gut 1996;39:562-568

Table 4: HUNT 2002 study: comparison of diagnosis and extension of the different examinations [2]

Detection		Accuracy for resectability		Sensitivity for vascular invasion	
EUS	CT	EUS	CT	EUS	CT
27/27	25/27	20/22	19/22	6/7	7/7
33/34	26/34	25/30	23/30	13/16	9/16
		30/31	25/31	16/16	10/16
29/31	16/31	16/16	13/16	6/6	3/6
97%	73%	91%	83%	91%	64%
<0.001		0.02		<0.001	

Table 5: Comparison of the performance of BSE and MRI in the diagnosis of choledochal lithiasis according to VERMA *et al*., 2005 [1]

	Se	Sp	VPP	VPN	LR +	LR-
EE	0,93	0,96	0,93	0,96	23,04	0,07
CP-IRM	0,85	0,93	0,87	0,92	12,14	0,16

II. COMPARISON BETWEEN OUR RESULTS AND THOSE OF THE LITERATURE

1. Symptomatology

The predominant symptoms in our study were abdominal pain, jaundice, and altered general condition. These symptoms are also predominant in the following studies:

Table 6: Comparison of different symptom

	ICTERUS	ABDOMINAL PAIN	AEG	PRURITUS
DUMAS PEYRET 2018 [3]	86	50%	50%	12%
OUR SERIES	**25%**	**44%**	**15%**	**5%**

2. CT scan results:

The results of our series showed a predominance of pancreatic tumours at 29%, biliary tract dilatation is hardly visible on CT and cystic tumours of the pancreas. Our results are in agreement with the studies used below.

Table 8: Comparison of CT scan results

	Pancreatic tumour	Dilatation of the VB	Cystic Tm
Dumas Peyret 2018 [3]	22%	11%	5%
Our series	29%	4%	3%

4. BILI-IRM results

Biliary dilatation predominates in our BILI-MRI results with a prevalence of 30% in agreement with other studies found, as this examination is more sensitive for the visualisation of the bile ducts. Pancreatic tumours were also detected in 29% of cases. Lithiasis was found in 10% of cases.

Table 9: Comparison of BILI-MRI results

	Tm pancreas	Bile duct Tm	Biliary tract dilatations	Lithiasis pathology
Badji *et al*., DAKAR 2016 [4]	12%	35%	30%	29%
Our series	**29%**	**4%**	**29%**	**10%**

5. Pancreatic tumour pathology:

Pancreatic tumour detection EUS and CT

Using histology results as a reference for our comparisons, we found a diagnostic sensitivity of CT in pancreatic cancers in the order of 68% with a sensitivity of EUS of 88%. Indeed this is in agreement with the following studies.

We can see that EUS plays a very important role in pancreatic cancer, its interest is indisputable for the diagnosis and for the assessment of the extension of cancers considered operable. In our series, we diagnosed 30 cases of pancreatic cancer by endoscopic ultrasound, which corresponds to 30% of our patients.

Table 10: Comparison of our CT sensitivity results with the literature

	EUS	CT
HUNT 2002	97%	73%
VOLMAR GIE 2005	87%	82%
BORATH 2005	98%	84%
Our series	**88%**	**68%**

Table 11: Comparison of our CT tumour detection capability results with the literature

	Sensitivity EUS vs CT (%)
PALAZZO [5]	Detection: 96 vs 66 Invasion: 87vs 76
YASUDA [6]	Invasion: 79 vs 47
MULLER [7]	ADP 50 vs 38
NAKAIRUMI [8]	Detection: 94 vs 88
NAKAIRUMI	Invasion: 90 vs. 70
Our series	**Detection: 88 vs 68**

6. Cholangiocarcinomas

Echoendoscopically, cholangiocarcinomas usually present as hypoechoic masses extending along a segment of the main bile duct within the lumen. EUS found 4 suspected cholangiocarcinomas biliary MRI 1 case, 2 cases of cholangiocarcinomas were confirmed on histology.

7. Cystic tumours

They are visualised on EUS as a cystic tumour communicating with the Wirsung and accessory pancreatic ducts. Malignancy may be suspected by the existence of hypoechoic nodules in the wall, rupture of the duct, invasion of neighbouring organs or the common bile duct or the existence of metastatic adenopathy or vascular invasion.

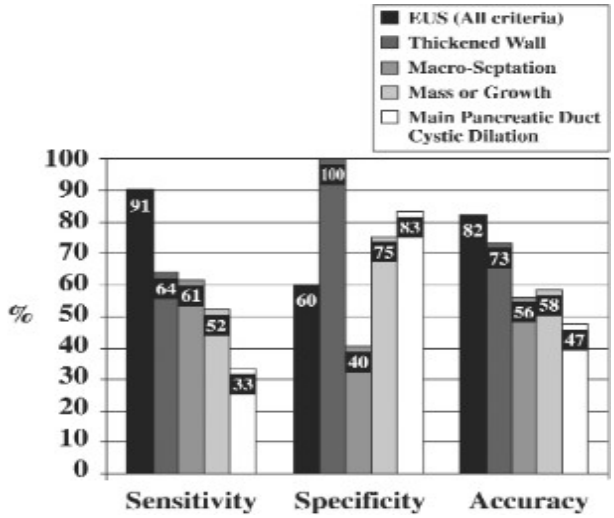

Figure 7: Value of SEA in the diagnosis of cystic tumours of the pancreas

8. Acute pancreatitis

EUS has never been validated in the diagnosis of acute pancreatitis. However, EUS can be useful in making the aetiological diagnosis of acute pancreatitis when it is lithiasis or a tumour obstructing the pancreatic ducts.

It should be used systematically in cases of acute pancreatitis of undetermined origin if ultrasound or CT scan have not been helpful

9. Lithiasis pathology:

Several studies have attempted to calculate the sensitivity and specificity of BSE in the diagnosis of choledocholithiasis. [9]. Palazzo has shown, in a series of 422 patients, that the sensitivity is 95% and the specificity is close to 100% [7]. In our series, there were 10 cases of main biliary tract lithiasis diagnosed by EES. Of the 15 cases, which received ultrasound, only 2 were detected by ultrasound. Of the 20 cases that received abdominal CT scans for hepatic colic or pancreatitis, only 6 were diagnosed by CT. Among the 23 cases who benefited from BILI-MRI for lithiasis pathology, 13 cases were diagnosed by the latter. This would prove that EUS is more sensitive than CT in this pathology but remains comparable to BILI-MRI These results are comparable to those found in the majority of previous studies

Table 12: Sensitivity of EES and MRI according to the literature and our series

	EES	MRI
Lee YT *et al*., [9]	84-100%	60-100%
VERMA *et al*., [10]	96%	93%
Our series	97%	53%

The EUS was therefore able to individualise several unnoticed lithiasis or lithiasis migration and thus avoid an exhaustive ERCP. As a complement to ERCP, it has allowed a more complete and rapid management of patients requiring biliary prostheses or sphincterotomy. EUS has also allowed the histology of several malignant-looking masses to be cleared.

CONCLUSION

Endoscopic ultrasound is currently an essential diagnostic and therapeutic tool in several pathologies of the pancreas and bile ducts.

In biliary and pancreatic pathology, the current indications are: the search for lithiasis of the main bile duct in case of moderate probability before endoscopic retrograde cholangiopancreatography (ERCP); the diagnosis and extension of tumours of the pancreas, papilla and bile ducts; the diagnosis of endocrine tumours; the etiological diagnosis of cystic lesions of the pancreas, as well as the diagnosis of chronic pancreatitis at an early stage. Nevertheless, abdominal CT and BILI-MRI remain non-invasive examinations that often allow the diagnosis to be made and a complete extension of the tumours to be assessed at a distance. Endoscopic ultrasound has seen a development of interventional indications: biliary drainage, pain management as well as anti-tumour treatments, drainage of false cysts or abscesses of the pancreas and solar plexus neurolysis. But these techniques are not available in all facilities.

BIBLIOGRAPHY

1. Verma, D., Kapadia, A., Eisen, G. M., & Adler, D. G. (2006). EUS vs MRCP for detection of choledocholithiasis. *Gastrointestinal endoscopy*, *64*(2), 248-254.
2. http://naxos.biomedicale.univ-paris5.fr/diue/wp-content/uploads/2021/02/DIUE2021m1-Echoendoscopie-P-BURTIN.pdf
3. Dysmas, P. (2018). Analysis of the diagnostic performance of biliary cytology collected by aspiration and brushing during endoscopic retrograde cholangiopancreatography in simultaneous comparison with pancreatic cytopuncture performed during pancreatic echo-endoscopy in the diagnosis of malignant biliary strictures. *Human Medicine and Pathology*, ffdumas-01879821ff
4. Badji, N., Akpo, G., Deme, H., Toure, M. H., Ly, M., & Ndong, B. (2016). Place de la bili-IRM dans le diagnostic etiologique des icteres cholestatiques à Dakar. *Pan African Medical Journal*, *24*(1).
5. Palazzo, L., Roseau, G., Gayet, B., Vilgrain, V., Belghiti, J., Fekete, F., & Paolaggi, J. A. (1993). Endoscopic ultrasonography in the diagnosis and staging of pancreatic adenocarcinoma. *Endoscopy*, *25*(02), 143-150.
6. Yasuda, K., Mukai, H., Nakajima, M., & Kawai, K. (1993). Staging of pancreatic carcinoma by endoscopic ultrasonography. *Endoscopy*, *25*(02), 151-155.
7. Müller, M. F., Meyenberger, C., Bertschinger, P., Schaer, R., & Marincek, B. (1994). Pancreatic tumors: evaluation with endoscopic US, CT, and MR imaging. *Radiology*, *190*(3), 745-751.
8. Nakaizumi, A., Uehara, H., & Iishi, H. (1995). Endoscopic ultrasonography in the diagnosis and staging of pancreatic cancer, *Dig Dis Sci*, 40(3), 696-700.
9. Lee, Y. T., Chan, F. K., Leung, W. K., Chan, H. L., Wu, J. C., Yung, M. Y., ... & Sung, J. J. (2008). Comparison of EUS and ERCP in the investigation with suspected biliary obstruction caused by choledocholithiasis: a randomized study. *Gastrointestinal endoscopy*, *67*(4), 660-668.
10. Verma, D., Kapadia, A., Eisen, G. M., & Adler, D. G. (2006). EUS vs MRCP for detection of choledocholithiasis. *Gastrointestinal endoscopy*, *64*(2), 248-254.