

## COMPARISON BETWEEN TRIPHASIC CT AND EUS PANCREATIC BIOPSY IN CHARACTERIZATION OF PANCREATIC LESIONS

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### ABSTRACT:

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**Background:** In the detection of pancreatic lesions, diagnostic imaging aims to expand therapeutic options from palliative to curable. Diagnostic imaging techniques have been developed to elevate the ability to diagnose pancreatic cancer. To have the best possible outcome for the patient and avoid wasting time, it is critical to choose the appropriate diagnostic technique based on the intended outcomes and characteristics of those procedures.

**Aim of the Work:** Evaluation of the added value of multislice contrast-enhanced computed tomography in the assessment and characterization of pancreatic lesions compared to endoscopic ultrasound regarding biopsy findings.

**Patients and Methods:** A total of 30 individuals with pancreatic lesions were enrolled and subjected to triphasic CT and endoscopic ultrasound and findings were correlated with results of pathological biopsy findings.

**Results:** Triphasic CT was better than EUS in the detection of vascular invasions especially distant ones that the EUS couldn't detect them as the left gastric artery, Left renal vein, inferior vena cava, and the left gonadal vein. Triphasic CT could demonstrate mass invasion of the superior mesenteric, portal, and splenic veins better than EUS. On the other hand, lesions  $\leq 1.5$  cm were detected easily by EUS as it detected 7 lesions, while triphasic CT detected only one and the other 6 cases showed bulky pancreatic head.

**Conclusion:** Triphasic CT is more accurate and sensitive than EUS in vascular invasion detection. while EUS is more accurate and sensitive in detecting lesions  $\leq 1.5$  cm.

**Keywords:** Triphasic Computerized Tomography; Endoscopic Ultrasound; Pancreatic Lesions.

### INTRODUCTION:

Several different benign and malignant tumor types can develop in the pancreas <sup>(1)</sup>. The seventh most common cause of cancer-related death is pancreatic cancer.

The most widespread type over 90 % of pancreatic cancer is pancreatic adenocarcinoma (PDAC). Diabetes mellitus, chronic pancreatitis, pancreatic cysts, and family risk resulting from susceptibility gene

mutations are some of the risk factors for pancreatic cancer <sup>(2)</sup>.

In terms of pathophysiology, pancreatic cystic lesions can be divided into simple retention cysts, pseudocysts, and cystic neoplasms. Solid pancreatic lesions also include cystic lesions. A common form of cystic tumor with a malignant potential is mucinous cystic neoplasm. The second most common type is benign serous cystadenoma <sup>(3)</sup>.

Neoplastic or non-neoplastic solid pancreatic lesions are both occurring. Neoplastic lesions include pancreato-blastoma, lymphoma, metastatic tumors, ductal adenocarcinoma, neuroendocrine tumors, solid pseudopapillary neoplasm.

Focal pancreatitis, fatty infiltration, congenital malformations in the pancreas, intra-pancreatic accessory spleen, and other conditions like tuberculosis or sarcoidosis are examples of non-neoplastic lesions<sup>(4)</sup>.

To classify pancreatic lesions, reliable diagnostic images of detailed anatomical features will be helpful. Such imaging modalities may help to establish an accurate diagnosis and decide on the course of treatment<sup>(5)</sup>.

Very fine slice cuts, great image quality, and quicker image capture are all features of multi-detector CT. Excellent enhancement of pancreatic parenchyma at Porto venous and arterial phases done using multi-slice CT, enables improved visualization of pancreatic cancer and its relation to the SMA, SMV, celiac artery, and portal vein.

This might help with proper staging and early diagnosis of pancreatic cancer. Therefore, MDCT with intravenous contrast is usually seen as the imaging method of choice for most people who have pancreatic cancer suspicions that need to be investigated initially<sup>(6)</sup>.

Due to its excellent resolution, EUS may easily visualize the pancreas, CBD, and nearby anatomical organs. The combination of EUS and FNA, known as EUS-FNA, is more effective in identifying solid pancreatic lesions; according to several studies<sup>(7)</sup>.

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#### **AIM OF THE WORK:**

This study aims to evaluate the added value of multi-slice contrast-enhanced computed tomography (CT) in the assessment and characterization of pancreatic

lesions compared to endoscopic ultrasound (EUS) regarding biopsy findings.

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#### **PATIENTS AND METHODS:**

This prospective diagnostic accuracy testing study was conducted at the Radiology Department, Theodore Bilharz Research Institute from February and Faculty of Medicine, Ain Shams University Hospitals from February 2022 until June 2023.

**Study population:** Patients attended the internal medicine outpatient clinic, radiology, and endoscopy units with the following criteria:

**Inclusion criteria:** Patients with pancreatic lesions. Age: 18 – 80 years old. Their serum creatinine is within the normal range, Able to consent and undergo contrast-enhanced CT and EUS examinations.

**Exclusion criteria:** Patients with any contraindication to undergo anesthesia or endoscopic examination. Patients with active acute pancreatitis or pancreatic necrosis. Patients with coagulopathy. Pregnant and renal impairment patients.

**Sampling Method:** Convenience targeted sampling.

**Sample size:** A total of 30 patients with pancreatic lesions were enrolled, after consenting each of them.

**Confidentiality:** In the case report form only the patient's initials were recorded, and when the patient's name appeared on any other document, it kept secured by the investigators. The investigators saved a list of personal patient identification (Patient initials with the corresponding patient names) to enable records to be identified.

**Protocol approval:** Before the study began and in accordance with the local regulations followed, the protocol and all the related documents were declared for research and ethical approval by the council of the radiology department, Ain Shams University.

**Concerning safety and efficacy: CT**

Carries the optional risk of radiation exposure, and the critical unfamiliar side effects of iodinated contrast agent are allergic/non-allergic anaphylactic, arrhythmia, and contrast-induced kidney injury. Other less serious side effects are, pain or change in normal temperature cold/warm at the injection site, vomiting, nausea, headache, paresthesia and itching. **For EUS FNA:** It has low complications risk including bleeding, pancreatitis, abdominal pain, fever, infection, duodenal perforation, and pancreatic fistula.

**Study interventions and procedures:**

This study was conducted on 30 patients with pancreatic lesions in radiology and endoscopy units. All patients with pancreatic lesions were identified with previous abdominal ultrasounds that revealed the presence of pancreatic lesions or clinical manifestations of abdominal pain or dyspepsia, pancreatitis, and jaundice. Patients were investigated by contrast enhanced Multislice CT, EUS with pancreatic biopsy, serum creatinine, INR and CA19.9 levels.

1. Patients were subjected to contrast-enhanced Multislice CT using non-Ionic contrast media a 16-channel multi-detector rows CT scanner (Alexion; Toshiba medical systems), with non-ionic contrast media (Omnipaque 150 ml IV infusion with the concentration of 350 mg I/ml) were administered.
2. Then the patients underwent EUS with pancreatic biopsy using echo-endoscope pentax EG3870UTK, and the pancreatic biopsy was taken by FNA 22 or FNB 19.22.
3. Image data from CT and Endoscopic ultrasound were interpreted by the research supervisors and expert doctors and compared the results of the CT with the results of the EUS.

**Statistical analysis:**

Data were analyzed statistically by Frequencies and Percentages to represent the information about variables; The Mann–Whitney U test is used to estimate the differences between two independent groups on ordinal data along the degree and direction of the relationship between two ranked variables are measured by Spearman's rank correlation. Also, sensitivity and specificity; as positive and negative predictive values of a test were calculated (SPSS, 2015). A probability (P value) of 0.05 or less was regarded as statistically significant, conversely, a P value more than 0.05 was considered not significant.

IBM SPSS (2015): Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.

**Ethical considerations:**

Patient information and informed consent: Before being enrolled in the study, the patient consented to be a participant after the scope, nature, and probable complications has been explained to the patients. The study was approved by the Faculty of Medicine, Ain Shams University Research Ethical Committee (FMASU MS 202/2022 on 10/03/2022).

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**RESULTS:**

Thirty patients were enrolled in this study 19 (63%), the mean age was  $58.16 \pm 11.07$  and 11 (37%), the mean age was  $60.0 \pm 7.32$  for males and females, respectively.

About 53 % of the cases seen by the EUS were described as hypoechoic mass, the other cases about 47% were described as heterogenous masses, pancreatic cysts, or pancreatitis associated with pancreatic mass and thickened pancreaticoduodenal groove. On the other hand, regarding the CT about 43.3 % of the cases were described as hypodense mass, the other cases about 56.7 % were described as heterogenous mass,

pancreatic cyst, pancreatitis, and bulky pancreatic head with no sizable lesion within.

In about 73% at CT and 66 % at EUS, the pancreatic lesions were located mainly at the head +/- other pancreatic parts, the rest of the lesions are noticed on other pancreatic parts as the neck, body, and tail.

Regarding pancreatic lesion size as shown in Table (1), The CT measured 22 pancreatic lesions, in the remaining 8 patients (7 patients revealed bulky pancreatic head with no sizable lesion and the last one demonstrated pancreatitis with walled-off necrosis). On the other hand, EUS measured

28 lesions, the remaining 2 unmeasured lesions EUS showed thickened pancreaticoduodenal groove. About 7 lesions demonstrated by EUS were  $\leq 1.5$  cm, compared to only one case demonstrated by the CT method and the CT missed 6 lesions  $\leq 1.5$  cm, while the lesions measured more than 1.5 cm are 21 lesions demonstrated equally by both methods. EUS is better than CT in detecting small-sized lesions  $\leq 1.5$  regards the probability results that show a significant difference between both methods, on the other hand no significant difference between both methods in detecting lesions  $>1.5$  cm.

**Table 1:** Comparison between triphasic CT and EUS regarding the measurement of the size of the pancreatic lesion among the studied group.

| Parameter |               | Frequency (%)              |         |                             |         | P     |
|-----------|---------------|----------------------------|---------|-----------------------------|---------|-------|
|           |               | CT (number of patients=22) |         | EUS (number of patients=28) |         |       |
|           |               | +                          | -       | +                           | -       |       |
| Size      | $\leq 1.5$ cm | 1 (4.0)                    | 21 (96) | 7 (25)                      | 21 (75) | 0.04* |
|           | $>1.5$ cm     | 21 (96)                    | 1 (4.0) | 21 (75)                     | 7 (25)  | NS    |

\*Significant, ( $P \leq 0.05$ ); \*\*highly significant, ( $P \leq 0.01$ ) and NS: not significant, ( $P \geq 0.05$ ), (-) = The number of remaining cases other than the (+) ones from the total measured cases by the method (CT or EUS) is calculated for each size and method separately to get the P value for each size.

As regards the detection of vascular invasions, the CT identified 7 cases (with 16 sites of invasions), SMV were invaded in 4 cases, SV invaded in 3 cases, PVC invaded in 3 cases, PV invaded in 2 cases, while LGA, IVC, LGV, and LRV each was invaded in one

case. On the other hand, EUS identified 5 cases (with 8 invasion sites), SMV were invaded in 3 cases, SV invaded in 2 cases, PVC invaded in 2 cases, and PV invaded in one case, as seen in Table (2).

**Table 2:** Detailed sites of vascular invasions in CT and EUS of the studied patients.

| Item                     | CT number of vascular invasion sites =16 | EUS number of vascular invasion sites =8 |
|--------------------------|--|--|
| Superior mesenteric vein | 4  | 3  |
| Portal vein              | 2  | 1  |
| Portal venous confluence | 3  | 2  |
| Splenic vein             | 3  | 2  |
| Inferior vena cava       | 1  | 0  |
| Left gastric artery      | 1  | 0  |
| Left renal vein          | 1  | 0  |
| Left gonadal vein        | 1  | 0  |

As regards FNB pathology, the highest value was about 73% (22 out of 30) for Adenocarcinoma followed by about 7% (2

out of 30) for adenocarcinoma + chronic pancreatitis, while other pathologies (Epithelial type neoplasm, intraductal

*Comparison between Triphasic CT and EUS Pancreatic Biopsy.....*

papillary mucinous neoplasm, pancreatitis with walled-off necrosis, simple cyst, and undifferentiated carcinoma) each one came last with a value of nearly 3%.

Spearman’s correlation coefficients and probability between variables Table (3), there was a very strong correlation and highly significant probability between Tumor

marker CA19.9 and FNB, a medium correlation and highly significant probability between pancreatic duct and FNB pathology, a weak correlation and significant probability between lesion size and vascular invasion, and a very weak correlation with a not significant probability between lesion size and metastasis.

**Table 3:** Spearman’s correlation coefficients and probability between variables.

| Variables                |  | Correlation value | P  |
|--------------------------|--|-------------------|----|
| The relationship between | Tumor marker CA19. 9 and FNB pathology   | 0.89              | ** |
|                          | Pancreatic duct and FNB pathology        | 0.57              | ** |
|                          | Size of the lesion and vascular invasion | 0.30              | *  |
|                          | Size of the lesion and metastasis        | 0.18              | NS |

\*Significant, ( $P \leq 0.05$ ); \*\*highly significant, ( $P \leq 0.01$ ) and NS: not significant, ( $P \geq 0.05$ ).

Regarding the detection of pancreatic adenocarcinoma Table (4), EUS is more accurate (93.3%), sensitive (92.3%), and has a better negative predictive value (66.6%)

than CT shows (76.6%) accuracy, (73%) sensitivity, and (36.36%) negative predictive value.

**Table 4:** Comparability between EUS and triphasic CT in the diagnosis and detection of pancreatic adenocarcinoma among the studied group.

| Parameter | TP | FP | TN | FN | Accuracy | Specificity | Sensitivity | PPV  | NPV    |
|-----------|----|----|----|----|----------|-------------|-------------|------|--------|
| EUS       | 24 | 0  | 4  | 2  | 93.33%   | 100%        | 92.31%      | 100% | 66.67% |
| CT        | 19 | 0  | 4  | 7  | 76.67%   | 100%        | 73.08%      | 100% | 36.36% |

\*Endoscopic ultrasound (EUS), Computed tomography (CT), True positive (TP), True negative (TN), False positive (FP), False negative (FN), Negative predictive value (NPV), Positive predictive value (PPV).

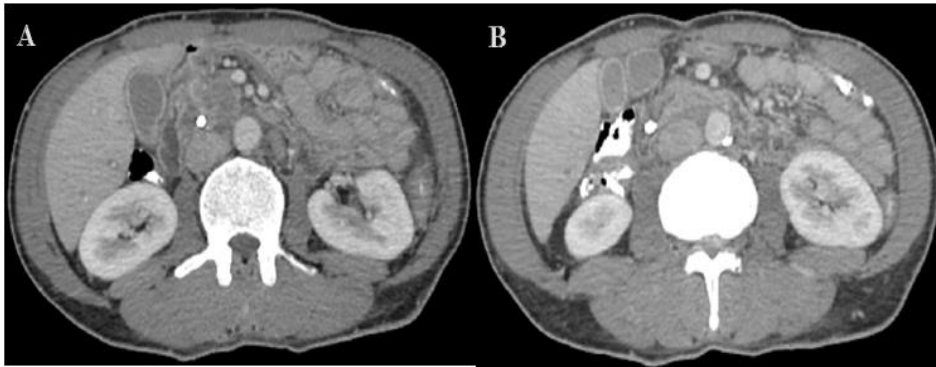
Regarding cancer antigen 19.9, it showed elevated levels in (80%) of the patients and (20%) were normal. The sensitivity and specificity of tumor marker CA19.9 is 100% in pancreatic adenocarcinoma cases.

No significant difference between both methods as regards the presence of enlarged LNs, non-nodal non-vascular Mets, CBD

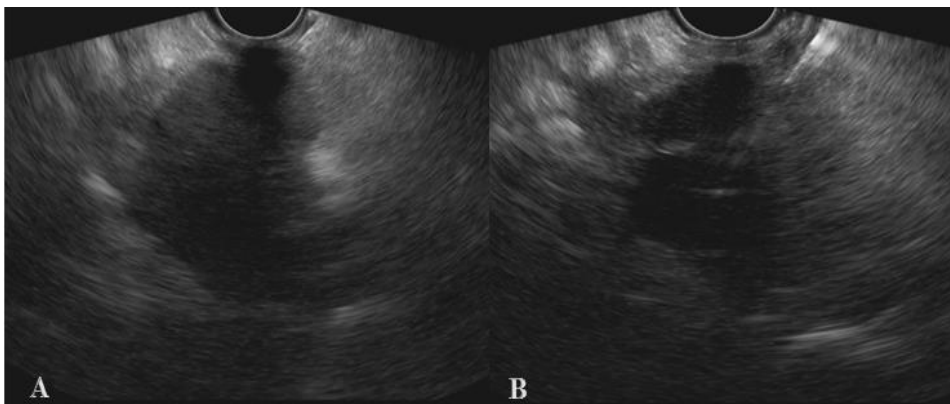
stent, CBD, IHBRs, and pancreatic duct dilatations.

**Illustration Cases:**

**Case 1:** A male patient 55 years old has pancreatic adenocarcinoma with indentation to the 3<sup>rd</sup> part of the duodenum Figure (1&2). His histopathology revealed pancreatic adenocarcinoma.



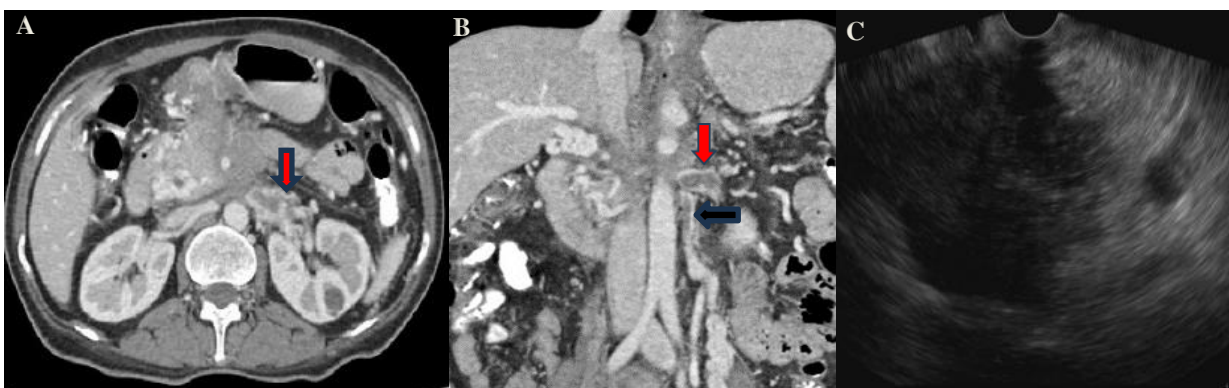
**Figure 1:** Axial CT at portal phase shows (A) An ill-defined hypo-enhancing soft tissue mass lesion is seen centered upon the pancreatic head and uncinate process measuring roughly 2.2 x 2.4 cm along its maximum axial dimensions. (B) Indenting the 3rd part of the duodenum.



**Figure 2:** Endoscopic ultrasound shows (A) hypoechoic lesion at pancreatic head/uncinate process measuring about 4.6 x 3.5 cm, (B) EUS-FNB of the pancreatic head/uncinate process lesion.

**Case 2:** A case female patient 50 years old has pancreatic adenocarcinoma confirmed by pathology, with encasing of

SMA, splenic, and left renal vein thrombosis (invasion) Figure (3).



**Figure 3:** CT portal phase shows (A) Axial and (B) coronal, an ill-defined hypodense lesion involving the junction of the pancreatic head and body measuring roughly 4.6 x 3.3 cm in maximum. It is seen merging posteriorly with irregularly shaped soft tissue mass encasing the SMA. Distended left renal (red arrow) and left gonadal (black arrow) veins showing intra-mural hypodense filling defects. (C) EUS shows an ill-defined hypoechoic mass located at the pancreatic head/body measuring 4.8 x 3.5 cm.

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## DISCUSSION:

The most popular and well-researched imaging technique for identifying and grading pancreatic cancer patients is computed tomography (CT)<sup>(8)</sup>.

A pancreatic CT protocol involves triphasic cross-sectional imaging with thin slices using multidetector CT, the protocol composed of three phases which are the arterial, late arterial, as well as venous phases<sup>(9)</sup>.

The triphasic CT demonstrates the difference in contrast enhancement between the parenchyma and adenocarcinoma, making it easy to distinguish clearly between a hypodense lesion in the pancreas and the remainder of the organ<sup>(10)</sup>.

The triphasic CT protocol allows for selective visualization of important arterial and venous structures, thereby allowing assessment of vascular invasion by tumor<sup>(11)</sup>.

An established technique for assessing pancreatic lesions is endoscopic ultrasonography (EUS). Due to the closer proximity of endoscopic ultrasound to the pancreas, endoscopic ultrasound offers a high sensitivity to detect small pancreatic masses and is the modality of choice for gaining tissue for diagnosis<sup>(12)</sup>.

In our study, regarding detecting pancreatic adenocarcinoma EUS was more accurate (93.3%), and sensitive (92.3%) than CT which shows (76.6%) accuracy and (73%) sensitivity.

The current study is compatible with a study by *Hunt and Faigel*<sup>(13)</sup>: EUS had a superior rate in the detection of pancreatic tumors: EUS 97, helical CT 73%.

Nowadays, the major technique for finding pancreatic lesions is EUS. 94% was the average sensitivity among 1170 investigations. It had a higher sensitivity than CT and MRI as reported by *Kitano et al.*,<sup>(14)</sup>.

EUS with fine needle biopsy has recently become a commonly used technique for pancreatic cancer tissue diagnosis. *Banafea et al.*,<sup>(7)</sup> have reported the sensitivity of endoscopic ultrasound with fine needle aspiration for pancreatic cancer was 85–92% and the was 96–98%.

*Gonzalo-Marin et al.*,<sup>(15)</sup> said that EUS is one of the most accurate methods for the diagnosis of inflammatory, cystic, and neoplastic diseases of the pancreas, and EUS is also recommended for solid pancreatic masses differential diagnosis; regardless of all the advances with the multi-slice computed tomography scan, differentiation between auto-immune pancreatitis, mass-forming chronic pancreatitis and ductal adenocarcinoma, is difficult when depending on the CT only.

As regards the site of pancreatic lesion, our study revealed that the highest value of (53%) (Over half of the patients) was located at the pancreatic head in EUS compared to the value of (43%) in CT.

*Artinyan et al.*,<sup>(16)</sup> noticed that 60% of PC develops in the pancreatic head and 40% develops in the body and tail, this agrees with us that pancreatic adenocarcinoma most common site is the pancreatic head.

Regarding the detection of the small-sized lesions  $\leq 1.5$  cm EUS was more accurate (100%), and sensitive (100%) than CT (73.91% accuracy and 14.29% sensitivity).

*El-Deeb et al.*,<sup>(17)</sup> compared the CT and EUS as regarding accuracy in diagnosing the pancreatic focal lesions, it showed that the detection rate for pancreatic focal lesions via EUS was 97.7%, with good identification for tumors less than 2 cm in size.

This agrees with *Somers and Bipat*<sup>(18)</sup>, who reported that the detection rate for pancreatic tumors by EUS is 90–100%, with good detection for tumors less than 3 cm in

diameter. A drawback of multislice-detector CT is that it is not as sensitive for pancreatic tumors with lesions smaller than 3 cm in diameter.

*Müller et al.*,<sup>(19)</sup> investigated 49 patients with pancreatic tumors less than 3 cm and reported that the sensitivities of the EUS is 93%, CT is 53% and the MRI is 67%.

*Maguchi*<sup>(20)</sup> recorded that the EUS demonstration rate for tiny sized (< 20 mm) pancreatic tumors was high as (100%) not including carcinoma in situ, on the other hand to 50% and 60% for CT and US, respectively.

*Sakamoto et al.*,<sup>(21)</sup> also said that the EUS has a higher sensitivity (94.4%) as compared to the CT with contrast (its sensitivity was 50%) for pancreatic tumors less than 2 cm.

*Kitano et al.*,<sup>(22)</sup> reported that the EUS can detect the pancreatic lesions that missed by the other modalities.

*Uehara et al.*,<sup>(23)</sup> said that the accuracy of endoscopic ultrasound with fine needle aspiration for pancreatic tumors less than 1 cm was 96%, and *Takagi et al.*<sup>(24)</sup> reported that the accuracy of tumors less than 1 cm was 93%.

*Kurihara et al.*,<sup>(25)</sup> investigated the EUS ability for the early detection of pancreatic cancer. They said that the highest sensitivity for the detection of small pancreatic tumors among the imaging modalities was the EUS. When the tumors are not visible on MRI and CT in cases of main PD dilatation or stenosis, EUS should be performed.

There was a positive correlation and highly significant probability between pancreatic duct dilatation and FNB result, Therefore, after the exclusion of associated pancreatic duct stones, in the CT patients with undetected small sized masses that had prominent/dilated pancreatic duct this is a good clue of raise the suspicious of underlying mass/lesion.

*Cai et al.*,<sup>(26)</sup> said that dilatation of the pancreatic duct is a warning indication for pancreatic cancers; nonetheless, tiny lumps or masses at the pancreatic tail or uncinate process might not have an impact on the pancreatic duct size.

Also, *Francis*<sup>(27)</sup> agreed with us, as he reported that the indirect signs such as 'upstream' pancreatic duct dilation or the 'double duct' sign due to pancreatic and common bile duct obstruction are helpful in diagnosing the small iso attenuating tumors.

Triphasic CT had a superior rate than EUS at the demonstration of a pancreatic mass invasion of the SV, PV, PVC, and SMV. However, CT detected distant vascular invasions such as the LGA, IVC, LGV, and LRV while the EUS couldn't detect any.

CT had the highest accuracy in detecting the vascular invasion (83%), whereas EUS had the highest accuracy in assessing tumor size said by *Soriano et al.*,<sup>(28)</sup> which agreed with the current study.

*Dufour et al.*,<sup>(29)</sup> also said that computed tomography is better than endoscopic ultrasonography in the diagnosis of the pancreatic malignancy and the assessment of vascular involvement.

*Ramsay et al.*,<sup>(30)</sup> said that the overall accuracy for detecting vascular invasion was 78% for MRI, 79% for CT, and 68% for EUS.

We disagreed with *Gonzalo-Marin et al.*,<sup>(31)</sup> who stated that EUS is better at vascular infiltration (90%), compared with 75% for CT and 85% for angiography (85%).

In all cases of pancreatic adenocarcinoma, the tumor marker CA 19.9 was elevated with a significant correlation to fine needle biopsy results, it showed 100% sensitivity and specificity. Accordingly, in cases of suspected pancreatic tumors using triphasic CT, a tumor marker as CA 19.9 is advised to be done to increase its diagnostic accuracy in adenocarcinoma cases.



This agrees with *Kim et al.*,<sup>(32)</sup> who measured CA 19.9 in about 70 thousand asymptomatic individuals and found that the specificity is 98.5% and the sensitivity is 100%. However, he reported that the PPV of CA 19-9 in the asymptomatic population for identification of pancreatic cancer is only 0.9%.

Also, a study made by *Ballehaninna & Chamberlain*<sup>(33)</sup> revealed that CA 19-9 test have sensitivity between 79% and 81% and specificity between 82% and 90% as for pancreatic cancer diagnosis in the symptomatic patients.

*Wu et al.*,<sup>(34)</sup> reported that the estimation of serum CA19-9 and CEA levels preoperatively are closely related to the life expectancy in patients with pancreatic cancer and accordingly they may be used for assessment pancreatic cancer prognosis.

Our study showed no differences between EUS and CT in the detection of regional lymph-node involvement and these results agreed with *De Witt J et al.*,<sup>(35)</sup> who said that for nodal staging, the two methods had similar overall accuracy: 44% for EUS vs 47% for CT.

Meanwhile, these results contradicted with *Barrio et al.*,<sup>(36)</sup> who stated that CT with contrast was more accurate than EUS in the detection of lymph node involvement.

*Dufour et al.*,<sup>(29)</sup> said that as regards the identification of lymph node involvement, endoscopic ultrasonography is superior to helical computed tomography.

## CONCLUSION:

From our study, we conclude that triphasic CT is more accurate than EUS in the detection of vascular invasion. At the same time, EUS is more accurate and sensitive in detecting small-sized lesions  $\leq 1.5$  cm; therefore, the study advises starting investigations by triphasic CT (as it is less invasive, cheaper with few complications) alongside with CA 19.9 to improve its

accuracy in suspected adenocarcinoma cases. If the diagnosis is still not reached, EUS  $\pm$  FNB has to be performed (as it is more sensitive and specific with the ability of tissue biopsy).

## Conflict of interest:

No conflict of interest to declare.

## List of abbreviations

|         |                                    |
|---------|------------------------------------|
| CA19-9  | : Cancer antigen 19-9              |
| CBD     | : Common bile duct                 |
| Cm      | : Centimeters                      |
| CT      | : Computed Tomography              |
| EUS     | : Endoscopic ultrasound            |
| FNA     | : Fine needle aspiration           |
| FNB     | : Fine needle biopsy               |
| IHBRs   | : Intrahepatic biliary radicles    |
| INR     | : International normalized ratio   |
| IVC     | : Inferior vena cava.              |
| LGA     | : Left gastric artery.             |
| LGV     | : Left gonadal vein.               |
| LN      | : Lymph nodes                      |
| LRV     | : Left renal vein.                 |
| MDCT    | : Multislice computed tomography.  |
| Mm      | : Millimeter                       |
| MRI     | : Magnetic resonance imaging       |
| N       | : Number                           |
| P value | : Probability                      |
| PC      | : Pancreatic cancer                |
| PDAC    | : Pancreatic ductal adenocarcinoma |
| PV      | : Portal vein                      |
| PVC     | : Portal venous confluence         |
| SMA     | : Superior mesenteric artery       |
| SMV     | : Superior mesenteric vein         |
| SV      | : Splenic vein                     |
| US      | : Ultrasound                       |

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## مقارنة بين التصوير المقطعي المحوسب ثلاثي الطور وخزعة البنكرياس في توصيف آفات البنكرياس

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**المقدمة:** في الكشف عن آفات البنكرياس، يهدف التصوير التشخيصي إلى توسيع الخيارات العلاجية من المطفة إلى القابلة للشفاء. تم تطوير تقنيات التصوير التشخيصي لرفع القدرة على تشخيص سرطان البنكرياس. للحصول على أفضل نتيجة ممكنة للمريض وتجنب إضاعة الوقت، من الأهمية بمكان اختيار تقنية التشخيص المناسبة بناء على النتائج والخصائص المقصودة لتلك الإجراءات.

**الهدف:** تقييم القيمة المضافة للتصوير المقطعي المحوسب المعزز بالتباين متعدد الشرائح في تقييم وتوصيف آفات البنكرياس مقارنة بالموجات فوق الصوتية بالمنظار فيما يتعلق بنتائج الخزعة.

**المرضى والأساليب:** تم تسجيل ما مجموعه 30 مريضاً يعانون من آفات البنكرياس وتعرضوا للأشعة المقطعية ثلاثية الطور والموجات فوق الصوتية بالمنظار وكانت النتائج مرتبطة بنتائج الخزعة.

**النتائج:** كان التصوير المقطعي ثلاثي الطور أفضل من الموجات فوق الصوتية بالمنظار في الكشف عن غزوات الأوعية الدموية وخاصة تلك البعيدة التي لم تستطع الموجات الصوتية بالمنظار الكشف عنها مثل الشريان المعدي الأيسر، الوريد الأوجف السفلي، الوريد التناسلي الأيسر، والوريد الكلوي الأيسر. يمكن أن يظهر التصوير المقطعي المحوسب ثلاثي الطور غزو كتلة البنكرياس للوريد البابي، والوريد المساريقي العلوي، والوريد الطحال أفضل من الموجات فوق الصوتية بالمنظار. من ناحية أخرى، تم الكشف عن الآفات أقل من أو تساوى 1.5 سم في الحجم بسهولة باستخدام الموجات فوق الصوتية بالمنظار فقد تمكن من تحديد وقياس 7 آفات، في حين كشف التصوير المقطعي ثلاثي الطور واحد فقط وأظهرت ال 6 حالات الأخرى بالتصوير المقطعي المحوسب ان هناك تضخم برأس البنكرياس.

**الخلاصة:** في الختام، التصوير المقطعي ثلاثي الطور هو أكثر دقة وحساسية من الموجات فوق الصوتية بالمنظار في الكشف عن غزو الأوعية الدموية. في حين الموجات فوق الصوتية بالمنظار هو أكثر دقة وحساسية في الكشف عن الآفات الصغيرة الحجم أقل من أو تساوى 1.5 سم.