

Is endoscopic ultrasonography superior to multidetector CT for assessing pancreatic cancer?

Original article De Witt J *et al.* (2004) Comparison of endoscopic ultrasonography and multidetector computed tomography for detecting and staging pancreatic cancer. *Ann Intern Med* 141: 753–763

SYNOPSIS

KEYWORDS computed tomography, detection, pancreatic cancer, staging, ultrasonography

BACKGROUND

The only potentially curative treatment for pancreatic cancer is complete resection including negative histologic margins (R0). Most tumors are not resectable on surgical exploration, so preoperative evaluation can avoid unnecessary invasive procedures in patients with such tumors. Studies indicate that endoscopic ultrasonography (EUS) is superior for detection and staging of pancreatic cancer, but there are no reports comparing EUS to multidetector CT.

OBJECTIVES

To compare EUS and multidetector CT for detecting, staging and evaluating resectability of suspected locoregional pancreatic cancer.

DESIGN

In a prospective, observational, cohort trial, patients from a single tertiary referral hospital presenting with suspected or diagnosed pancreatic cancer were enrolled. Exclusion criteria included prior endoscopic retrograde cholangiopancreatography or EUS or patient lack of commitment to potential surgery. Those considered at high surgical risk, or with known or suspected periampullary masses, cholangiocarcinomas or cancer with locally advanced arterial involvement or metastasis were also excluded.

INTERVENTION

Under conscious sedation, patients were examined with both radial and linear echoendoscopy. Unless cancer had been previously confirmed, EUS-guided fine needle aspiration was performed. Multidetector CT

was performed with a quad-channel scanner. Decisions for surgery were based on evaluation of surgical risk and EUS and CT findings.

OUTCOME MEASURES

The primary endpoint was comparison of EUS and multidetector CT for resectability. Secondary endpoints were tumor detection and staging.

RESULTS

Of 120 enrolled patients (59 men [57%], mean age [\pm SD] 64 ± 12 years), 104 patients remained after exclusions, of which 63 (61%) underwent surgery. For the 80 patients with pancreatic cancer, EUS detected a pancreatic mass with greater sensitivity than did CT (98% [CI 91–100%] vs 86% [CI 77–93%], $P=0.01$). For the 53 patients with pancreatic cancer who underwent surgery, 25 had resectable cancer and 28 had unresectable cancer. Tumor and nodal staging was possible in 49 and 45 patients respectively. EUS was more accurate overall for tumor staging than CT (67% [CI 52–80%] vs 41% [CI 27–56%], $P=0.007$). Both tests had 11% accuracy for staging of T1/T2 tumors. EUS was more accurate for detecting T3 tumors (74% [CI 52–90%]) than CT (30% [CI 13–53%], adjusted $P=0.026$), but there was no significant difference for T4 tumors. For nodal staging, the two methods had similar overall accuracy: 44% for EUS vs 47% for CT ($P>0.2$). Accuracy for N0 staging was 92% for both methods. Accuracy for staging of N1 tumors was 25% for EUS and 28% for CT ($P>0.2$). EUS and CT identified resectable pancreatic tumors correctly in 88% and 92% of cases respectively, and unresectable tumors in 68% and 64% respectively.

CONCLUSION

EUS was superior to multidetector CT for tumor detection and staging, but similar for nodal staging and resectability of nonmetastatic pancreatic cancer. Neither method was accurate for nodal staging of pancreatic cancer, mostly because of problems detecting N1 stage disease.

COMMENTARY

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Pancreatic cancer is usually diagnosed after symptoms and clinical signs become apparent in the patient. At this stage, diagnosis is generally not followed by curative therapy; at present, surgical resection can only provide an effective curative therapy in patients with early-stage pancreatic cancer. Surgical resection is often unfeasible in patients with advanced pancreatic cancer, owing to the involvement of arterial vessels or the infiltration of organs adjacent to the pancreas; in this situation only palliative therapy can be offered. As such, the prognosis and management of patients with pancreatic cancer not only depends on early diagnosis, but also on the accurate assessment of tumor staging. Among diagnostic procedures proposed for the detection and accurate staging of pancreatic cancer, endoscopic ultrasound (EUS), CT and MRI have been shown to be valuable and accurate methods.

In the study by DeWitt *et al.*, EUS and CT were evaluated for their ability to detect and stage pancreatic cancer. The sensitivity of EUS (98%) for detecting pancreatic tumors was greater than that of CT (86%, $P=0.012$). Furthermore, tumor stage was assessed more accurately by EUS than CT in patients who underwent surgery (67% vs. 41%; $P<0.001$). Both methods were equivalent for local nodal staging and resectability. DeWitt *et al.* concluded that EUS is superior for tumor detection and staging but similar to CT for nodal staging and resectability of preoperatively suspected nonmetastatic pancreatic cancer.

Several other studies^{2,3} report similar findings to those of De Witt *et al.*; however, CT has also been reported to be superior to EUS for detecting tumors.⁴ Akahoshi *et al.*³ showed that CT had a higher accuracy in the assessment of the extent of primary tumor (73%), locoregional extension (74%), vascular invasion (83%), distant metastases (88%), tumor–node–metastasis stage (46%), and tumor resectability (83%), whereas EUS had a higher accuracy in assessing tumor size and lymph node invasion (65%).

The decision analysis in the study by Akahoshi *et al.* demonstrated that the best strategy to assess tumor resectability was based on CT or EUS as the initial test, followed by the alternative technique in those patients who were considered potentially resectable. As in the study by DeWitt *et al.*, however, the expertise of the specialist carrying out the procedure, which is especially important in the use of EUS, was not discussed. It should also be kept in mind that a comparison of imaging techniques is always hampered by rapid advances in imaging technologies, with significant variations in efficacy depending on the specific apparatus that is used.

A major limitation of the DeWitt *et al.* study is owed to the fact that endosonographers were permitted to read the scans and radiologists were not blinded to previous radiographic information. A further limitation was the small number of patients with unresectable cancer who underwent surgery.

EUS and CT could be complementary methods in the detection and staging of pancreatic cancer. Cost-minimization analysis would favor a sequential strategy in which EUS is used as a confirmatory technique in those patients in whom CT indicates resectability of the tumor. Clinicians should also consider that EUS is a method that is heavily dependent on the local experience and dedication of the clinical investigator, probably more so than CT, which is available in almost every center.

References

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Acknowledgments

The synopsis was written by Petra Roberts, Associate Editor, Nature Clinical Practice.

Competing interests

The authors declared they have no competing interests.

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Received 25 February 2005

Accepted 15 March 2005

www.nature.com/clinicalpractice
doi:10.1038/ncpgasthep0136

PRACTICE POINT

EUS and CT should be performed in a complementary manner for the diagnosis and staging of pancreatic cancer