Endoscopic ultrasonography is a valuable diagnostic tool in patients with incidental findings in the pancreas or bile ducts

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ABSTRACT

INTRODUCTION: Incidental findings are often seen at computed tomographies (CT). This study describes patients who had an endoscopic ultrasonography (EUS) because of an incidental finding in the pancreas/bile duct.

METHODS: Patients referred for EUS between September 2012 and September 2013 because of an incidental finding in the pancreas/bile duct at a CT were prospectively enrolled. After EUS, the findings of this procedure were noted together with the plan for further diagnostic work up or therapy. A follow-up was made after 6 months and 1 year after EUS was performed.

RESULTS: A total of 47 patients (24 women, 23 men) were registered with an incidental finding. The median age was 69 years (range: 45-83 years). Diagnoses after performing EUS were: normal findings (n = 16), cystic lesion (n = 16), mass lesion (n = 6), inconclusive (n = 6) and other specified (n = 3). The plan after EUS was: no further evaluation (n = 27), referred for new EUS or other imaging procedures (n = 14) and referred for surgery/endoscopic retrograde cholangiopancreatography (n = 6). In total, 6 patients proved to have neoplastic diseases in the pancreas. None of the patients who were stopped from further evaluation following EUS later proved to have a malignant disease in the pancreas. **CONCLUSION:** EUS is a valuable diagnostic tool in patients with incidental findings in the pancreas/bile duct noted at a CT. Many patients can be stopped from further diagnostic work-up after EUS with a minimal risk of overlooking a malignant disease.

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Abdominal computed tomography (CT) is a widely used procedure. It is often performed for the primary workup in patients with abdominal complaints, but it is also used for staging of malignant diseases inside and outside the gastrointestinal tract or for follow-up on previously treated conditions. It is well known that incidental findings are seen at CT [1-8]. In some cases, these incidental findings represent real pathological conditions that need to be dealt with by different procedures such as surgical resection or additional follow-up. However, in other cases they are misinterpretations of the normal anatomy and further diagnostic work-up in these last cases is not needed and might be harmful to the patient.

Endoscopic ultrasonography (EUS) is an established procedure in the diagnostic work-up of patients suspected of disease of the upper gastrointestinal tract and pancreatic diseases [9]. Due to its relative invasiveness, EUS is rarely used as the initial procedure in these patients, but it is more often used after more widely available procedures like CT or gastroscopy have been performed.

The aim of the present study was to describe patients who underwent EUS because of an incidental finding in the pancreas/biliary tract noted at an abdominal CT.

METHODS

Patients referred to our department for EUS between September 2012 and September 2013 because of an incidental finding in the pancreas/distal bile duct noted at a CT were prospectively enrolled in the study. An incidental finding was defined as a potentially pathological condition that had no relation to the reason for performing the CT; for example the finding of a 2-cm mass lesion in the head of the pancreas in a patient for whom the indication for CT was constipation was considered an incidental finding (Figure 1). CT scans had been performed either at local hospitals or at our own department of radiology; but before deciding on an EUS, each patient had their CT re-evaluated at a multidisciplinary team conference including radiologists with a special interest in CT and gastro-intestinal diseases and the surgeons who would later perform the EUS, if decided. Thus, only those patients for whom EUS was chosen as the best procedure for further diagnostic work-up after the re-evaluation of the CT were eligible for the study.

EUS could be performed by any member of the team of surgeons who normally performed this procedure. Every endosonographer is highly skilled and has performed more than 500 procedures (150-200 procedures annually). A curved array Pentax echoendoscope connected to a Hitachi ultrasound platform was used for

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Incidentally detected mass lesion (arrow) in head of the pancreas.



the examinations. Midazolam/pethidine or propofol was given as sedation. All patients were seen on an outpatient basis.

The endosonographer noted the patient's age and gender. EUS fine needle aspiration (EUS-FNA) was performed when indicated and the conclusion of the pathology report was later registered. After performing EUS, the findings of the procedure were noted together with the plan for further diagnostic work-up or therapy. A follow-up on each patient was made 6 months after EUS had been done by studying the hospital's case record system which holds information on all patient contacts in the region. The follow-up primarily focused on which procedures had been performed depending on the different decisions made at EUS. Thus, for those patients who were found not to need any further diagnostic work-up or surgery following EUS, an additional followup was also made after one year in order to establish whether EUS had overlooked a malignant tumour.

Trial registration: The study was approved by the Danish Data Protection Agency via Region of Southern Denmark (case no. 13/27,321).

RESULTS

The department has a catchment population of approximately 1.2 million people and performed 1,029 EUS procedures during the year-long study. Of these, 47 patients (24 women, 23 men) were examined because of what was considered an incidental finding in the pancreas/distal bile duct noted at a CT. The median age was 69 years (45-83 years). The endosonographer's description of the suspected lesions is listed in **Table 1**. In one third of the

patients, nothing abnormal was found at the EUS. EUS-FNA was performed in 11 patients (mass lesion (n = 5), cystic lesion (n = 4), inconclusive (n = 2)). The pathology report showed: malignant cells (n = 3), benign cells (n = 4), atypical cells (n = 2), and inconclusive (n = 2). The plan after EUS/EUS-FNA and the status of the patients at the 6-month follow-up is shown in Figure 2. More than half of the patients avoided further diagnostic work-up after EUS. At the 6-month follow-up, none of these patients proved to have malignant disease. However, at the additional one-year follow-up, one patient with a cystic lesion had been referred for EUS again because the cyst was thought to have increased in size. Two patients had died. One had disseminated urological cancer and the other had a disseminated cancer for which the primary tumour was unknown.

In total, six (13%) patients proved to have neoplastic diseases in the pancreas. Of these, three patients were referred for surgery directly after EUS (adenocarcinoma (n = 2), neuroendocrine tumour (n = 1)) and two were referred for surgery after a re-EUS was performed (one adenocarcinoma, one neuroendocrine tumour). The last patient with a malignant disease was referred for laparoscopy after EUS and liver metastases were observed. In one patient referred for surgery after EUS, the resected specimen showed pancreatitis.

DISCUSSION

The present study shows that 5% of the EUS procedures performed in our department were due to incidental findings in the pancreas/distal bile duct noted at CT. Some previous studies have focused on incidentally noted mass or cystic lesions in the pancreas [10-12]. The conclusions from these series are that malignant lesions are rarely present and that EUS can determine a reliable diagnosis in most cases and spare many patients from further diagnostic work-up. The results of our study agree with these conclusions. Hence, more than half of the patients could be spared further diagnostic work-up following EUS. Of these, only one patient was observed

TABLE 1

Endosonographer's description of the incidental lesions in the pancreas/ bile duct originally noted at computed tomography.

Conclusion	n (%)
Nothing abnormal	16 (34)
Cystic lesion ^a	16 (34)
Mass lesion	6 (13)
Inconclusive	6 (13)
Other specified ^b	3 (6)

a) Pseudocyst (n = 9), cystic neoplasia (n = 6), not specified (n = 1).b) For example common bile duct stone.

Plan after endoscopic ultrasonography and status at six-month follow-up.



CT = computed tomography; ERCP = endoscopic retrograde cholangiopancreatography; EUS = endoscopic ultrasonography.

to be re-referred for new diagnostic work-up at the oneyear follow-up. Thus, the risk of a false negative EUS is very low.

It should be noted that in 14 (30%) patients, the endosonographer found that additional imaging procedures were necessary either for follow-up or for further diagnostic work-up. Three cases (21%) of malignant disease were later found among these patients. This observation is in good agreement with a previous study from our department in which pancreatic cancer was observed in 17 of 126 patients (14%) scheduled for a planned re-EUS [13]. Another reason for the observation that one third of the patients needed additional diagnostic work-up after EUS could be that one third of the patients had a cystic lesion in the pancreas. Though there seems to be no difference between EUS and magnetic resonance imaging (MRI) in terms of accuracy in these patients [14-16], the question of performing EUS/ MRI in patients with cystic pancreatic lesions seems more to be a "both/and" than an "either/or" [17].

The relatively high percentage of patients with normal findings at EUS raises the question whether EUS was, in fact, needed. Thus, was EUS the best available procedure for further diagnostic work-up for all patients in the present study or might some patients have benefitted from a new CT or MRI instead of EUS? Due to the design of the study, we are unable to answer this guestion because we only studied those patients with incidental findings at CT who were referred to the department for EUS. During the one-year study period, it is

possible that a new CT or a MR was performed in some patients following an incidental finding at a CT. If these patients were clarified sufficiently with a cross-sectional imaging procedure, a referral for EUS was never made and the patients were unknown to our department. Therefore, the present study only describes the value of EUS in the diagnostic work-up of patients with incidental findings at CT and, of course, this may be influenced by local expertise and availability of EUS.

Six (13%) patients proved to have a neoplastic disease in the pancreas. None of these were found among the patients who were spared further diagnostic workup after the initial EUS. However, it should be mentioned that there were two patients in this group who were noted to have died of disseminated cancers at the one-year follow-up, but subsequent diagnostic work-up had not revealed that the primary tumours were located to the pancreas. Therefore, the overall risk of an incidental finding representing a malignant disease is low. Due to the small number of patients and short observation period, this study is unable to clarify whether patients resected for incidentally found pancreatic neoplasms have a better outcome than patients resected for pancreatic neoplasms with clinical symptoms. Thus, it is, in fact, unknown if patients have any benefit of their early diagnosis. In relation to this, one must bear in mind that CT also had false positive findings. Thus, in the present study one patient had pancreatic resection where the specimen revealed pancreatitis. It is known that 5-10% of patients who are resected for presumed pancreatic

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cancers prove to have pancreatitis, and a recent study even indicates that this percentage is rising perhaps because of the growing use of CT [18].

CONCLUSION

EUS is a valuable diagnostic tool in patients with incidental findings in the pancreas/bile duct noted at a CT. Many patients can be spared further diagnostic work-up after EUS with a minimal risk of overlooking a malignant disease.

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