

ゴリに分類する。「軽症膵炎」でも胆石性か非胆石性かを診断できれば紹介先が決まってくる。また軽症患者が重症化したり、また逆に重症患者が軽症化した場合に搬送するようなフローチャートもある。

参加施設では、以上のカテゴリー分類と転送の流れを示す「南大阪地域連携システム」に賛同された。また、参加各病院が、対応できる医師の勤務状況、特殊な病態、診療日・時間帯によって受けいれできるかどうかは決定するが、基本的に4つのどのカテゴリーに分類されるかが確認された。さらに、参加施設間でこのカテゴリーの情報を共有していくことが決定した。

〔議題3 次回開催について〕

将来的にはこの会を定期的に関くこととなった。

●閉会の挨拶（近畿大学医学部外科 教授 竹山宜典）

以上、閉会

平成27年度第1回
『南大阪地域における急性膵炎診療の地域連携システム構築会議』

謹啓

大暑の候、皆様におかれましては益々ご健勝のこととお慶び申し上げます。

さて、この度「厚生労働科学研究—難治性疾患等政策研究事業—難治性膵疾患に関する調査研究」にて、下記の要領にて平成27年度第1回『南大阪地域における急性膵炎診療の地域連携システム構築会議』を開催することとなりました。

急性膵炎のうち特に重症例では、呼吸循環管理、内視鏡治療、外科治療、放射線治療、血液浄化治療等が必要となり、様々な診療科・医療チームが関わってまいります。

本会議では、各病院が急性膵炎に対してどのような診療行為が行えるかを明らかにし、南大阪地域において急性膵炎診療を円滑に行うシステムを構築することを目的としております。

より円滑な地域医療連携システムの構築のため、各病院の急性膵炎診療に携わる医師・医療連携(事務)担当者の方々に参加していただきたく、時節柄何かとご多用とは存じますが、万障お繰り合わせの上、御出席賜りますようご案内申し上げます。

別紙の御出欠の返信とともに事前アンケート調査 (8月15日締切)にもご協力頂けますと幸いに存じます。

謹白

記

日時：平成27年8月21日(金) 19:00～20:30

会場：近畿大学医学部附属病院 円形棟大講堂 (裏面参照)

※駐車場料金無料(駐車券をお持ちください)

※夕食は各自おすませの上、御出席ください。

<プログラム>

- 開会の挨拶 近畿大学医学部附属病院 外科 教授 竹山 宜典
- アンケート結果報告 近畿大学医学部附属病院消化器内科 大本 俊介
- 急性膵炎ガイドライン2015の紹介 近畿大学医学部附属病院消化器内科 准教授 北野雅之
- 急性膵炎地域連携システム構築のための議論

お問い合わせ先：近畿大学医学部外科肝胆膵部門

電話：072-366-0221 (内線：3115) FAX：072-368-3382

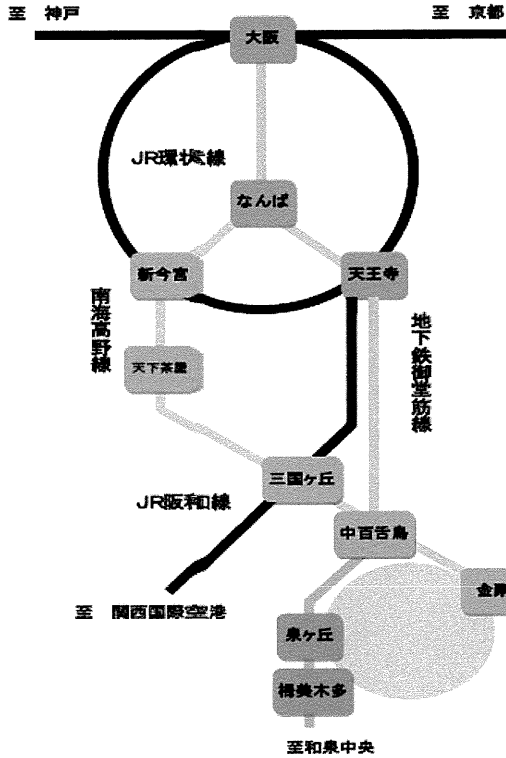
主催：近畿大学医学部附属病院外科・消化器内科

アクセス方法

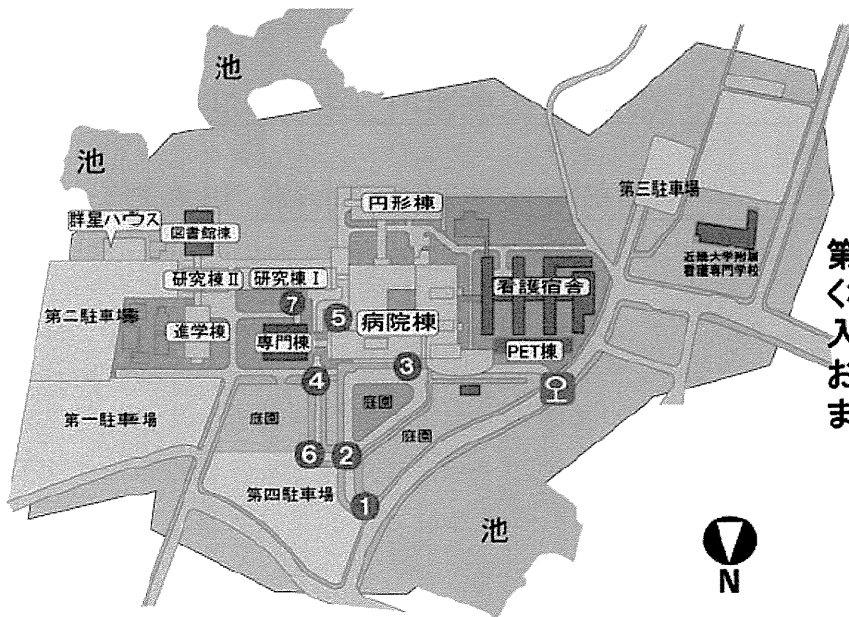
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● 南海電車「なんば」方面から南海高野線「金剛」駅で下車。南海コミュニティバス4番「狭山ニュータウン 泉ヶ丘」行き乗車、「近畿大学病院前」下車

● 南海電車「なんば」方面から泉北高速線「泉ヶ丘」駅で下車。南海コミュニティバス1番「狭山ニュータウン 金剛」行き乗車、「近畿大学病院前」下車



駐車場のご案内



第1、4駐車場が会場より一番近くなっております。
入口は③の入退院受付入口よりお入り下さいますようお願い致します。

【FAX 送信先】

近畿大学医学部外科肝胆膵部門 行

FAX 072-368-3382

平成 27 年度第 1 回

『南大阪地域における急性膵炎診療の地域連携システム構築会議』

御出席

御欠席

(いずれかに☑のうえ FAX にて 8 月 15 日までに御返送をお願い致します。)

御施設名 : _____

御芳名 : _____〈医師・医療連携（事務）担当者〉

御芳名 : _____〈医師・医療連携（事務）担当者〉

御芳名 : _____〈医師・医療連携（事務）担当者〉

【FAX 送信先】

近畿大学医学部外科肝胆膵部門 行

FAX 072-368-3382

事前アンケート

御施設名 _____

Q1 貴院では、急性膵炎（慢性膵炎急性増悪を含む）を治療していますか？

いいえ はい

Q2 急性膵炎は、主に何科が治療をしていますか？

外科 救命救急 消化器内科 内科 その他 ()

Q3 貴院では、急性膵炎の患者は、1年間で何人程度来院されますか？概算で結構です。
(人)

Q4 そのうち重症急性膵炎の患者は、何人ですか？ (人)

Q5 貴院では急性膵炎の重症度判定に厚生労働省の重症度判定基準を使用していますか？

いいえ はい

Q6 貴院で行っている、または行うことのできる膵炎の治療にチェックを入れてください。
(複数回答可)

NGチューブまたはEDチューブからの経腸栄養剤投与 蛋白分解酵素投与
 血液浄化療法 予防的抗菌薬投与 内視鏡的ドレナージ
 内視鏡的ネクロセクトミー 外科的ネクロセクトミー 呼吸循環管理

Q7 貴院では、急性膵炎を他院へ搬送することがありますか？

いいえ はい

特定の施設があれば記載してください

()

搬送するときにはどのような時ですか？具体的な記載をお願い致します。(病態や重症度など)

()

Q9 搬送がスムーズにできず困ったことがありますか？

いいえ はい

どのような場合ですか？具体的な記載をお願い致します。

()

Q10 南大阪以外の施設に急性膵炎患者を搬送したことがありますか？

いいえ はい

搬送する頻度が多い地域があれば記載してください

()

ご協力ありがとうございました。

Japanese Clinical Guidelines for Endoscopic Treatment of Pancreatolithiasis

Kazuo Inui, MD, PhD,* Yoshinori Igarashi, MD, PhD,† Atsushi Irisawa, MD, PhD,‡
Hirotaka Ohara, MD, PhD,§ Susumu Tazuma, MD, PhD,|| Yoshiki Hirooka, MD, PhD,¶
Naotaka Fujita, MD, PhD,# Hiroyuki Miyakawa, MD, PhD,** Naohiro Sata, MD, PhD,††
Tooru Shimosegawa, MD, PhD,‡‡ Masao Tanaka, MD, PhD,§§ Keiko Shiratori, MD, PhD,||||
Masanori Sugiyama, MD, PhD,¶¶ and Yoshifumi Takeyama, MD, PhD###

Objectives: In addition to surgery, procedures for patients with pancreatolithiasis are developing; therefore, establishing practical guidelines for the management of pancreatolithiasis is required.

Methods: Three committees (the professional committee for asking clinical questions (CQs) and statements by Japanese endoscopists, the expert panel committee for rating statements by the modified Delphi method, and the evaluating committee by moderators) were organized. Eight endoscopists and a surgeon for pancreatolithiasis made the CQs and statements from a total of 694 reports of published literature by PubMed search (from 1983 to 2012). The expert panelists individually rated these clinical statements using a modified Delphi approach, in which a clinical statement receiving a median score greater than 7 on a 9-point scale from the panel was regarded as valid.

Results: The professional committee made 3, 7, and 10 CQs and statements for the concept and pathogenesis, diagnosis, and treatment, respectively. The expert panelists regarded them as valid after a 2-round modified Delphi approach.

Conclusions: After evaluation by the moderators, the Japanese clinical guidelines for pancreatolithiasis were established. Further discussions and studies for international guidelines are needed.

Key Words: chronic pancreatitis, endoscopic pancreatic sphincterotomy, endoscopic pancreatic duct stenting, endoscopic minor papilla sphincterotomy, extracorporeal shock wave lithotripsy, pancreatectomy

(*Pancreas* 2015;44: 1053–1064)

From the *Department of Gastroenterology, Second Teaching Hospital, Fujita Health University, Nagoya, †Division of Gastroenterology and Hepatology, Toho University Omori Medical Center, Tokyo, ‡Department of Internal Medicine, Aizu Medical Center, Fukushima Medical University, Fukushima, §Department of Community-based Medical Education, Nagoya City University Graduate School of Medical Sciences, Nagoya, ||Department of General Medicine, Hiroshima University Graduate School of Medical Science, Programs of Applied Medicine, Clinical Pharmacotherapy, Hiroshima, ¶Department of Gastroenterology and Hepatology, Nagoya University Graduate School of Medicine, Nagoya, #Department of Gastroenterology, Sendai City Medical Center, Sendai, **Division of Biliopancreatology, Sapporo Kosei General Hospital, Sapporo, ††Department of Surgery, Jichi Medical University, Shimotsuke, ‡‡Division of Gastroenterology, Tohoku University Graduate School of Medicine, Sendai, §§Department of Surgery and Oncology, Graduate School of Medical Sciences, Kyushu University, Fukuoka, |||Department of Gastroenterology, Tokyo Women's Medical University, Tokyo, ¶¶Department of Surgery, Kyorin University School of Medicine, Mitaka, and ###Department of Surgery, Kinki University School of Medicine, Osakasayama, Japan.

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Reprints: Kazuo Inui, MD, PhD, Department of Gastroenterology, Second Teaching Hospital, Fujita Health University School of Medicine, 3-6-10, Ootobashi, Nakagawa-ku, Nagoya 454-8509, Japan
(e-mail: kinui@fujita-hu.ac.jp)

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Chronic pancreatitis is a progressive and irreversible disease characterized by recurrent episodes of acute inflammation that causes a gradual decrease of the endocrine and exocrine functions of the pancreas. If pancreatic stones develop during the long clinical course, pancreatic ductal hypertension can cause pain and pseudocysts, thereby further exacerbating the disease condition. Treatment of pancreatic stones is extremely important. The Japanese Society of Gastroenterology published the “Japanese clinical diagnostic criteria for chronic pancreatitis” in 2009, and the Intractable Pancreatic Diseases, supported by the Ministry of Health, Labor, and Welfare of Japan prepared the “Guidelines for the treatment of pancreatolithiasis” in cooperation with the Japan Pancreas Society, and published in 2010 with the aim of detailing the treatment of pancreatolithiasis mainly by endoscopy. However, these guidelines were written in Japanese. Here, we translated it to English and published it as a secondary publication in this journal of “Pancreas.” The level of evidence was not very high in papers on the treatment of pancreatic stones, and these guidelines just summarized the consensus of experts. A working group consisting of 9 members of the Guidelines Committee prepared the present guidelines, adopting a formal consensus development method, Delphi method,¹ that is thought to allow experts' opinions to be more objectively reflected. A draft of the guidelines prepared by the Guidelines Committee was reviewed by 3 members of the Evaluation Committee to prepare the final version. The guideline has illustrations of the flow chart of treatment, mainly endoscopy and extracorporeal shock wave lithotripsy (ESWL) (Fig. 1). It goes without saying that conventional treatment, surgery, should be preferentially used in some patients, and we hope that these guidelines will be used for providing appropriate treatment after a full investigation of the indications. By a curious coincidence, medical insurance coverage of ESWL was finally approved in April 2014. We hope that these guidelines will be useful for the management of chronic pancreatitis in clinical practice.

I. CONCEPT AND PATHOGENESIS

Clinical Question (CQ)-I-1. What Is Pancreatolithiasis?

- Pancreatolithiasis is a pathological condition characterized by the development of stones in the main pancreatic duct or its branches during the course of chronic pancreatitis. Pancreatic stones can lodge in the pancreatic duct causing dilation and tissue pressures resulting in pain.

Description

Chronic pancreatitis is a disease characterized by chronic changes such as irregular fibrosis, cell infiltration and loss of parenchyma occurring diffusely in the pancreas. Chronic pancreatitis is progressive and irreversible, and runs a long clinical course with repeated episodes of acute inflammation resulting in a gradual

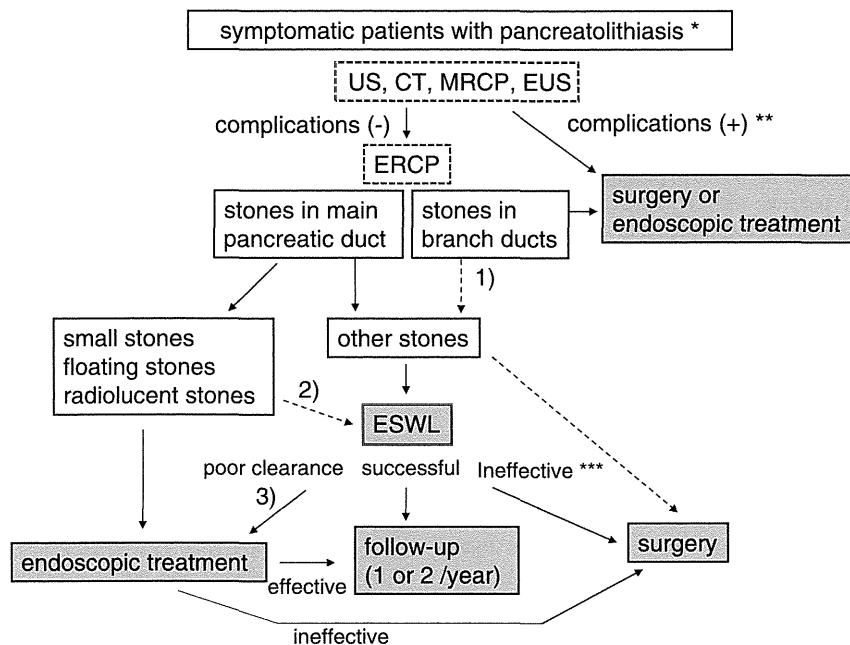


FIGURE 1. Flowchart for the treatment of pancreatic stones. (1) Stones in branches associated with stones in the main pancreatic duct can be treated by ESWL. (2) Endoscopic treatment is effective for small stones measuring 5 to 6 mm in diameter or less, floating stones, X-ray-negative stones, and so on, but if it is possible to focus on these stones in pancreatography using an endoscopic nasal pancreatic duct drainage catheter, ESWL should be performed. (3) If the patient has stenosis of the duodenal papilla or stricture of the main pancreatic duct, endoscopic treatment such as dilation should be concurrently used to facilitate stone passage. *Asymptomatic patients should be kept under observation or receive treatment, such as conventional conservative medical treatment. The patients may receive treatment to improve pancreatic functions if pancreatic parenchymal atrophy is absent and pancreatic stones are impacted in the main pancreatic duct. **Endoscopic treatment is effective for small stones measuring 5 to 6 mm or greater in diameter, floating stones, radiolucent stones, and so on, but if it is possible to focus on these stones in pancreatography using an endoscopic nasal pancreatic duct drainage catheter, extracorporeal shock wave lithotripsy (ESWL) should be performed. (CQ-I-3). ***Stones filling the pancreatic duct and stones that are present only in the tail of the pancreas and likely to be difficult to be cleared by endoscopic treatment should undergo surgery (CQ-III-2).

decrease in endocrine and exocrine function.² Pancreatic stones, including protein plugs, which are protein aggregates, and calcified pancreatic stones, formed by crystallization, mainly of calcium carbonate, on a protein core, develop in the main pancreatic duct or its branches during the course of chronic pancreatitis.³ Pancreatic stones are classified by size into large stones, small stones, or mixed small and large stones, and by distribution into the diffuse and localized types.⁴ Small stones are considered to be common in alcoholic pancreatitis, whereas large stones are known to be more common in idiopathic pancreatitis. Pancreatic stones can lodge in the pancreatic duct and cause dilation and tissue pressure resulting in pain,^{5,6} and pseudocyst formation, thereby further exacerbating the pathological condition of chronic pancreatitis.

CQ-I-2. What Are the Clinical Symptoms?

- Pancreatolithiasis causes clinical symptoms, such as intense upper abdominal pain and abdominal tenderness, but some patients have no obvious symptoms.

Description

There are 2 phases of chronic pancreatitis: the “compensatory phase,” characterized by recurrent clinical symptoms, such as abdominal pain, back pain, anorexia, nausea/vomiting, diarrhea and weight loss, and the “noncompensatory phase,” characterized by mild abdominal pain, but digestion and absorption disorders (exocrine insufficiency), such as steatorrhea, and diarrhea and diabetes (endocrine insufficiency).^{2,7} Pancreatolithiasis was previously considered as a feature of the terminal phase of chronic pancreatitis, however, with the recent advances in diagnostic imaging

techniques, pancreatic stones have come to be recognized even in the compensatory and transition phases of the disease. Approximately 80% of patients with chronic pancreatitis have abdominal pain, whereas approximately 5% have no abdominal pain (painless).⁸ In addition, the initial symptoms and clinical signs of chronic pancreatitis vary according to the cause.^{4,8,9} It is often difficult to treat pancreatolithiasis, because it is characterized by more severe pain and pancreatic endocrine/exocrine insufficiency as compared to chronic pancreatitis without stones.

CQ-I-3. What Are the Complications?

- Complications of pancreatolithiasis include acute pancreatitis, pancreatic pseudocyst, pancreatic fistula, gastrointestinal obstruction, portal hypertension, obstructive jaundice, digestion and absorption disorders, pancreatic diabetes, hemosuccus pancreaticus, and pancreatic cancer.

Description

There are limited reports on the complications of pancreatolithiasis; however, pancreatic stones themselves are a complication of chronic pancreatitis, and the complications of pancreatolithiasis overlap with those of chronic pancreatitis. The complications of chronic pancreatitis include acute pancreatitis, pancreatic pseudocyst, pancreatic fistula (including pancreatic pleural effusion and ascites), gastrointestinal obstruction, portal hypertension (including portal vein thrombosis), obstructive jaundice, digestion and absorption disorders, pancreatic diabetes, and hemosuccus pancreaticus,^{4,6,10} all of these complications are also observed in patients with pancreatolithiasis. However, there have been almost

no reports investigating the association between these complications and the presence of pancreatic stones, except the association between pancreatic endocrine/exocrine insufficiency and the presence of pancreatic stones.^{10,11} According to a report in Japan, severe pancreatic exocrine insufficiency is observed in 50% of patients with pancreatolithiasis and 21.8% of patients with noncalcifying pancreatitis, and diabetes is observed in 77.5% of patients with pancreatolithiasis and 22.4% of patients with noncalcifying pancreatitis. Therefore, pancreatolithiasis can be considered to represent a manifestation of advanced chronic pancreatitis. In general, pancreatic exocrine insufficiency causes maldigestion and malabsorption of lipids, carbohydrates, proteins, trace elements, and fat-soluble vitamins, leading to undernutrition and steatorrhea.^{12,13} Pancreatic diabetes due to pancreatic endocrine insufficiency also tends to be characterized by hypoglycemia associated with reduced glucagon secretion¹² and has to be managed with care.

In addition, a high proportion of patients with chronic pancreatitis are at an increased risk of developing malignant neoplasms, such as pancreatic cancer.^{14,15} Of the patients with chronic pancreatitis, those with pancreatolithiasis are at an approximately 27-fold higher risk of developing pancreatic cancer than healthy individuals.¹⁶ In particular, pancreatic cancer developing from pancreatitis associated with large stones has been reported even in relatively young patients.⁹ Pancreatic stones have been estimated to have developed in 4.5% of patients with pancreatic cancer.¹⁷

II. DIAGNOSIS

CQ-II-1. Are Blood Tests Useful?

- Blood tests have low diagnostic specificity, but could provide a clue to the diagnosis.

Description

In chronic pancreatitis, pancreatic juice stasis and acute pancreatitis due to pancreatic stones sometimes cause abnormally high pancreatic enzyme levels. However, if the condition of the pancreas is stable, abnormally high pancreatic enzyme levels are not usually observed, except for some cases showing persistently elevated levels associated with concomitant pancreatic pseudocysts and other diseases (eg, neoplastic pancreatic disease). A retrospective study also reported that only 5 patients (5.7%) had abnormally high serum amylase levels,¹⁸ therefore, abnormally high pancreatic enzyme levels are not necessarily useful for the diagnosis of pancreatolithiasis.^{18,19}

On the other hand, patients with advanced chronic pancreatitis in the non-compensatory phase often have abnormally low pancreatic enzyme levels.²⁰ Serum levels of nonspecific amylase, pancreatic amylase, lipase and trypsin have been reported to show diagnostic sensitivities of 16%, 83%, 92%, and 92%, respectively, for the diagnosis of chronic pancreatitis, while the diagnostic specificity for all the enzymes was 100%.²⁰ Another study reported that trypsin, which can be measured at a higher sensitivity than other pancreatic enzymes, is useful for the diagnosis of pancreatic exocrine insufficiency. Based on the above, abnormally low blood trypsin levels observed in the absence of attacks of abdominal pain may suggest the possibility of severe pancreatic exocrine insufficiency. However, many patients with other diseases (eg, postpancreatic surgery and neoplastic pancreatic disease) develop pancreatic exocrine insufficiency, whereas a fair number of patients with pancreatolithiasis may not develop pancreatic exocrine insufficiency. Therefore, abnormally low pancreatic enzyme levels are not necessarily specific for the diagnosis of pancreatolithiasis. However, these blood tests are noninvasive and can be easily

performed, and abnormally high or low levels of pancreatic enzymes could be a clue to the diagnosis of chronic pancreatitis. Accordingly, blood tests are one of the diagnostic items included in the 2009 clinical diagnostic criteria for chronic pancreatitis.

Presence of diabetes, type I hyperlipidemia, or hepatic dysfunction may provide a clue to the diagnosis of pancreatolithiasis,⁴ but these findings are not specific to pancreatic diseases and blood tests for these diseases also do not have sufficient diagnostic ability.

CQ-II-2. Is Plain Abdominal Radiography Useful?

- Plain abdominal radiography is useful for the diagnosis of calcified pancreatic stones.

Description

Plain abdominal radiography allows easy diagnosis of stones, including diagnosis of the distribution of calcified pancreatic stones and is also used to assess the effects of treatment. Stones are most seen at the level of the 12th thoracic to second lumbar vertebrae, and multiple stones can often be seen as calcifications aligned in an oblique direction (Fig. 2). Morphologies, such as coarse nodular, fine granular, solitary, and diffuse morphologies, can be roughly assessed. It is sometimes difficult to identify pancreatic stones by plain frontal abdominal radiography alone, and 3-dimensional (frontal and left and right oblique) radiography is useful.²¹ However, it is difficult to determine whether the calcifications are present inside or outside the pancreas in some patients. Calcification is seen in 17% to 60.8% of patients with chronic pancreatitis,^{22,23} and 68% of pancreatic stones detectable by computed tomography (CT), which has the highest diagnostic ability for calcification, can be identified by plain abdominal radiography. Accordingly, plain abdominal radiography is a low-cost and useful test for the diagnosis of calcified pancreatic stones.

CQ-II-3. Is Ultrasonography (US) Useful?

- Ultrasonography is useful for the diagnosis of pancreatic stones.

Description

Abdominal US is a simple, minimally invasive examination method causing little pain to the patients, like blood biochemistry

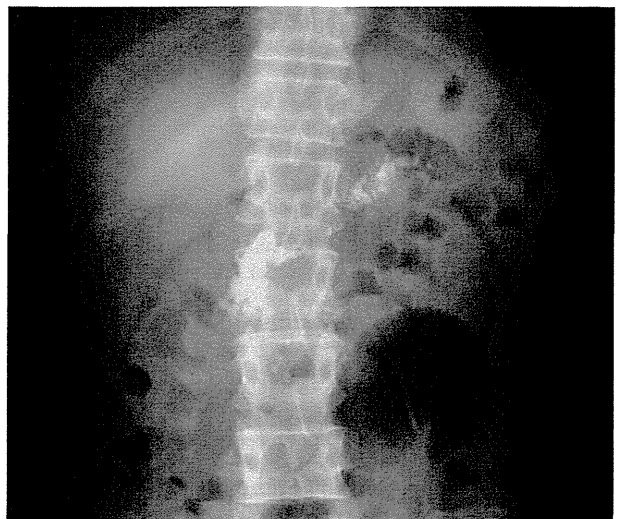


FIGURE 2. Plain abdominal radiography for diagnosis of pancreatic stones. Irregularly shaped calcifications are seen at the level of the first to second lumbar vertebrae.

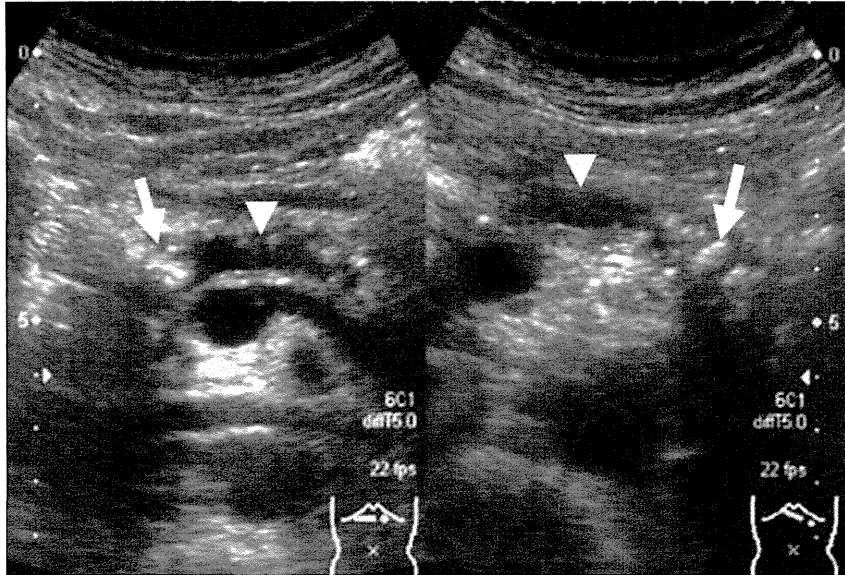


FIGURE 3. US images of a patient with chronic pancreatitis. Hyperechoic images (stone echo; arrows) with AS are seen in the main pancreatic duct (arrowheads), which shows irregular dilatation from the head of the pancreas to the tail.

and abdominal radiography, and is widely used in the diagnosis of abdominal pathologies.

In the 2009 clinical diagnostic criteria for chronic pancreatitis proposed by the Japan Pancreas Society, “stones in the pancreatic duct and multiple or diffuse calcifications distributed in the whole pancreas” represent a definitive diagnostic finding of chronic pancreatitis, and hyperechoic images likely to be stones in the pancreas represent a probable diagnostic finding of chronic pancreatitis. Ultrasonographic observation of these stones enables the diagnosis of chronic pancreatitis. Stones, which are visualized as punctate or arch-shaped, variable-sized, hyperechoic images with clear acoustic shadows (AS) on US, may be solitary or multiple (Fig. 3). Hyperechoic images in the pancreatic parenchyma are included as a probable diagnostic finding in the diagnostic criteria; however, coarse hyperechoic images without AS may not always represent stones, but indicate fibrosis or fatty infiltration, thus necessitating careful observation. Interpretation of US images is affected by abdominal fat and gas, and the entire pancreas cannot be visualized. Pancreatic stones are visualized well in the pancreatic body and most poorly in the pancreatic tail, which itself is poorly visualized. In a prospective study of patients with suspected pancreatic disease, US allowed visualization of pancreatic stones in only 45% of the patients, and was thus, obviously inferior to CT (92%) and endoscopic US (EUS) (100%).²⁴ Therefore, US is a useful noninvasive method for the diagnosis of pancreatic stones, but has its limitations.

CQ-II-4. Is CT Useful?

- CT has the highest sensitivity for detecting the presence and determining the distribution of pancreatic stones. Multidetector CT (MDCT) allows visualization of the relationship between pancreatic stones and the main pancreatic duct and provides useful information on the feasibility of endoscopic treatment. On the other hand, it is difficult to diagnose radiolucent pancreatic stones by CT.

Description

The CT has been considered to be the most useful methods for detecting the presence and determining the localization of

pancreatic stones.^{25,26} The main component of pancreatic stones is calcium carbonate, and CT has an extremely high diagnostic sensitivity (Fig. 4). According to reports published in the 1980s and 1990s, CT had a sensitivity of 74% to 80% and specificity of 84% to 100% for the diagnosis of pancreatic stones.^{27,28} However, recently, with the wide dissemination of MDCT, which yields high temporal and spatial resolution, a high sensitivity of 83% to 100% and specificity of 100% have been reported.²⁹ In addition, MDCT also shows high sensitivity for visualization of the pancreatic duct³⁰ and enables detailed observation of the relationship between the pancreatic duct and stones, thereby providing useful information to determine the feasibility of endoscopic treatment, although contrast-enhanced CT is required in order to obtain information on the relationship between the pancreatic duct and stones. Calcification located at the pancreatic margin may represent calcification of the lymph nodes or the splenic artery around the pancreas, and localization diagnosis should be made with caution. In addition, it is difficult to diagnose radiolucent pancreatic stones.

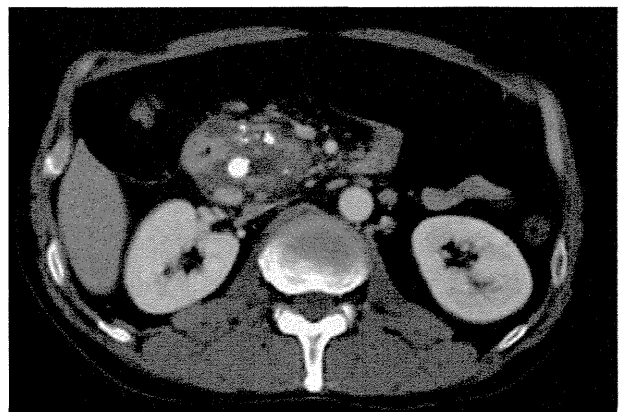


FIGURE 4. CT image of a patient with chronic pancreatitis. Pancreatic stones of various sizes are scattered in the head of the pancreas. Thus, CT can easily allow diagnosis of even microstones.

CQ-II-5. Is Magnetic Resonance Imaging (MRI)/Magnetic Resonance Cholangiopancreatography (MRCP) Useful?

- It is difficult to visualize pancreatic stones by MRI/MRCP, but pancreatic stones can be indirectly diagnosed based on the detection of signal loss on MRCP images of the pancreatic duct.

Description

It is difficult to visualize pancreatic stones per se by MRI/MRCP, but pancreatic stones can be indirectly diagnosed from areas of signal loss observed in the main pancreatic duct or its branches (Fig. 5). The MRCP has low spatial resolution and sometimes cannot detect slight changes of the pancreatic duct or allow visualization of stones in the pancreatic duct branches or small stones in the main pancreatic duct, necessitating caution.^{31,32} In addition, it is difficult to differentiate stones from protein plugs (radiolucent pancreatic stones) based on signal loss alone on MRCP images.³¹ On the other hand, MRCP is less invasive than endoscopic retrograde cholangiopancreatography (ERCP) and has the great advantage of allowing visualization of abnormalities, such as stricture/occlusion and dilatation, of the entire main pancreatic duct.³²⁻³⁴ Therefore, after detecting the presence of stones by CT, the relationship between the main pancreatic duct and the stones can be objectively examined by MRI/MRCP to determine the precise endoscopic treatment strategy. In addition, besides being a useful diagnostic method for radiolucent pancreatic stones, which cannot be easily detected by CT, MRI/MRCP has also been shown to be useful as a screening method for the diagnosis of pancreatic stones in patients complaining of gastrointestinal symptoms of unidentifiable cause by other tests.³⁵

CQ-II-6. Is ERCP Useful?

- ERCP is particularly useful for the diagnosis of pancreatic stones in the main pancreatic duct and X-ray-negative pancreatic stones.

Description

There have been no comparative or other studies examining the ability of ERCP to diagnose pancreatic stones (Fig. 6). In clinical practice, pancreatic stones can be diagnosed by relationship between the pancreatic duct and X-ray-positive images.³⁶⁻³⁸ In addition, X-ray-negative pancreatic stones and protein plugs can

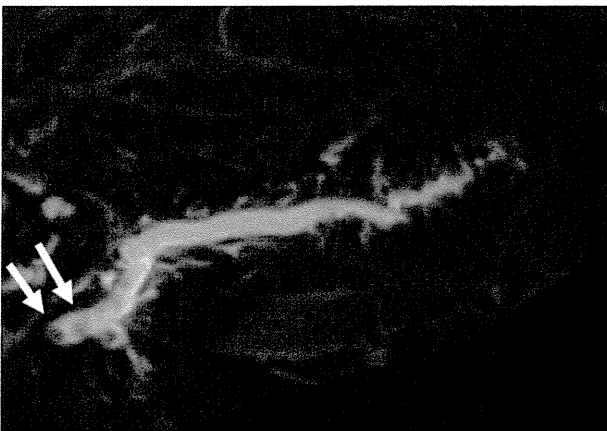


FIGURE 5. MRCP image of a patient with chronic pancreatitis. Translucencies (arrows) can be seen in the main pancreatic duct near the main papilla. In this case, the stones were confirmed by CT, but it was difficult to differentiate between stones and protein plugs by MRCP.

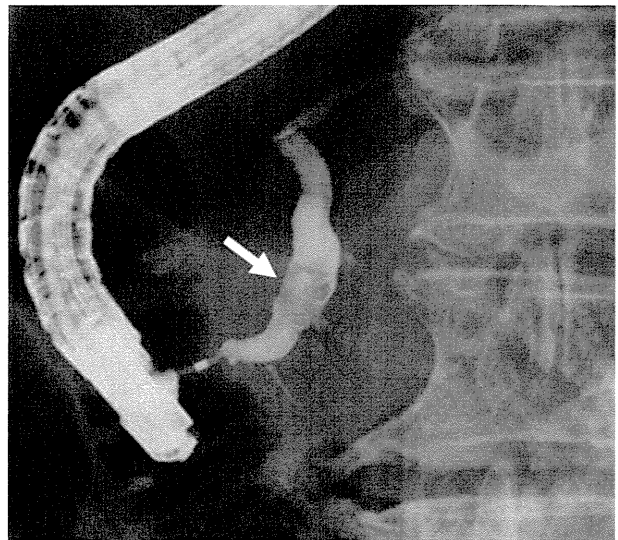


FIGURE 6. ERCP image of a patient with chronic pancreatitis. An oval translucency (arrow) is seen in the main pancreatic duct in the dilated pancreatic head.

also be visualized as shadow defects in the main pancreatic duct. The ERCP can diagnose only lesions in the pancreatic duct and merely allow speculation of stones in the pancreatic field based on the area of distribution of the branches. Also, the 2009 clinical diagnostic criteria for chronic pancreatitis proposed by the Japan Pancreas Society include demonstration of pancreatic stones by ERCP as one of the definitive diagnostic criteria. It is important to visualize the relationship between pancreatic stones and the pancreatic duct for determining a treatment plan. If pancreatic stones obstruct the main pancreatic duct, it will be difficult to assess the distal pancreatic duct by ERCP, and other tests will be necessary.

CQ-II-7. Is EUS Useful?

- EUS can accurately diagnose pancreatic stones. However, it depends on the proficiency of the operator.

Description

Endoscopic US can visualize pancreatic stones as hyperechoic images with AS (Fig. 7). Endoscopic US can show the presence of pancreatic stones in the pancreatic duct more directly than ERCP, and also allows visualization of calcified foci, not only in the main pancreatic duct but also in the pancreatic duct branches and the pancreas.³⁹ It has been reported that EUS can be useful for assessing the stage of chronic pancreatitis³⁹ and that, in particular, stones were the most useful independent EUS finding. Both the diagnostic sensitivity and specificity of EUS have been reported to be 85% or higher as compared to ERCP diagnosis based on the Cambridge classification,³⁸ the gold standard in patients with abdominal pain of unknown cause or suspected chronic pancreatitis who underwent EUS before the scheduled ERCP.⁴⁰ On the other hand, the assessment is operator-dependent, and a study using video tape recorder showed that the consistency of assessment of pancreatic stones among experts was not high, with a κ coefficient of 0.38,⁴¹ although this is a problem common to EUS diagnosis in any field. According to the 2001 clinical diagnostic criteria for chronic pancreatitis proposed by the Japan Pancreas Society, ultrasonographic diagnosis of pancreatic stones is a definitive diagnostic finding of chronic pancreatitis, and EUS, which has a higher sensitivity than US, is

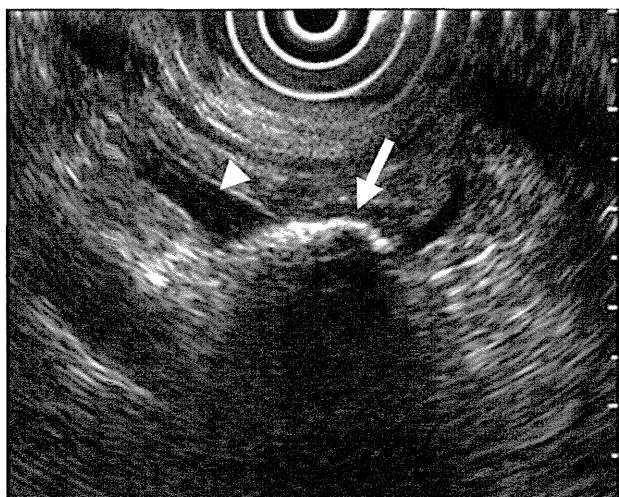


FIGURE 7. EUS image of a patient with chronic pancreatitis. A pancreatic stone echo with AS (arrow) is seen in the dilated main pancreatic duct (arrowhead).

considered as an important diagnostic method for obtaining a definitive diagnosis.

III. TREATMENT

CQ-III-1. What Are the Indications for Treatment?

- In principle, patients with stones in the main or accessory pancreatic duct who have persistent pain or recurrent acute attacks of pancreatitis should receive treatment. Pancreatic duct strictures and pseudocysts, if any, should also be treated in addition to pancreatic stone removal.

Description

Pancreatic stones, which develop during the course of chronic pancreatitis, particularly in the compensatory to transition phase, lead to stasis of pancreatic juice and pancreatic ductal hypertension, thereby causing abdominal pain and progression of pancreatitis (see CQ-I-1, 2). Therefore, in patients with persistent pain or recurrent symptoms of pancreatitis (eg, back pain, abdominal pain, diarrhea, and soft stool), stones should be removed to facilitate the outflow of pancreatic juice and thereby alleviate symptoms. Pancreatic duct strictures and pseudocysts, if any, should also be treated in addition to pancreatic stone removal.

Noninvasive stone removal treatments such as ESWL and endoscopic treatment are indicated for patients with pancreatic stones in the main or accessory pancreatic duct.^{40,41} Furthermore, pancreatic duct strictures and pseudocysts, if any, should also be treated to improve the outcome of treatment of pancreatic stones and to prevent recurrence after treatment.⁴²⁻⁴⁵ According to a multicenter case study in Japan, treatment of pancreatolithiasis was highly effective (91.9–98.5%) in eliminating symptoms, with scarce differences among treatment methods.^{42,44} The efficacy of litholysis and treatments to improve the composition of the pancreatic juice to reduce the likelihood of pancreatic stone formation (oral trimethadione and intrapancreatic duct injection of citrate) has also been reported, in addition to that of stone removal, resolution of pancreatic duct strictures and treatment of pseudocysts are effective⁴⁵; however, these treatments are not covered by medical insurance. Asymptomatic patients may be kept under observation, but if pancreatic parenchymal atrophy is not observed and pancreatic juice stasis caused by pancreatic stones is suspected,

treatment may be given to improve the pancreatic functions. If the patient has complicating bile duct strictures, endoscopic or surgical treatment should be selected considering the type of medical institution.⁴⁶⁻⁴⁸

CQ-III-2. What Are the Treatments Available? How Should the Best Treatment Option Be Selected?

- Treatments for pancreatolithiasis include medical treatment (ESWL and endoscopic treatment) and surgical treatment (pancreatic duct drainage and pancreatectomy).
- Low-invasiveness should be considered first for treatment selection, but the cost-effectiveness, long-term pain relief rate and reoperation rate should also be taken into account.
- The use of ESWL and endoscopic treatment should be considered first for patients with pancreatolithiasis who need treatment, but surgical treatment may be indicated in some patients from the outset.

Description

Treatments for pancreatolithiasis can be divided into surgical and medical treatments. Medical treatments include endoscopic treatment and ESWL, and surgical treatments include pancreatic duct drainage and pancreatectomy. Total pancreatectomy plus pancreatic islet autotransplantation is sometimes performed in western countries, but has rarely been performed in Japan.

One retrospective study⁴⁹ and 3 randomized controlled trials (RCTs)⁵⁰⁻⁵² have compared endoscopic and surgical treatments for pancreatolithiasis. According to these studies, the short-term incidence of complications, length of hospital stay, and so on, after endoscopic treatment were equivalent to or better than those after surgical treatment, whereas the long-term pain relief rate and reoperation rate were significantly more favorable after surgical treatment. A study of 140 patients with pancreatic duct strictures, 76 of whom underwent surgical treatment (resection in 61 patients and pancreatic duct drainage in 15 patients), and the remaining 64 of whom underwent endoscopic treatment (papillotomy alone in 31 patients and pancreatic duct stenting in 33 patients) reported that the 5-year complete pain relief rate was significantly higher after surgical treatment (37% vs 14%).⁵⁰ A study of 39 patients with symptomatic chronic pancreatitis with pancreatic duct strictures but no inflammatory mass, of whom 19 were randomized to endoscopic treatment (including 18 with pancreatic stones and 16 who concurrently underwent ESWL) and 20 to surgical treatment (pancreatic duct-jejunum side-to-side anastomosis in 18 patients, Frey operation in 1 patient, and pancreaticoduodenectomy in 1 patient) showed that the outcome measures, including the 2-year complete pain relief rate (75% vs 32%), were significantly better in the group assigned to surgical treatment.⁵¹ A study of the same patients 5 years later reported that the pain relief rate was significantly better in the surgical treatment group (80% vs 38%) and that 47% of patients in the endoscopic treatment group had undergone additional surgical treatment during the intervening 5 years.⁵² In a questionnaire survey of 899 patients in Japan (survey period: 2001 to 2005), the symptom relief rate was as high as 98.5% in 133 patients who had undergone surgical treatment, although the incidence of early complications (eg, anastomotic insufficiency, pseudocyst formation and intraperitoneal bleeding) was also higher in this group (13.5%) than in the endoscopic treatment and ESWL groups.⁴² Overseas cohort studies and RCTs of surgical treatment have reported an incidence rate of early complications of 8% to 35%, operative mortality rate of 0% to 3.6%, and pain relief rate during an observation period of 2 to 14 years of 55% to 75%.⁴⁹⁻⁶¹ Studies comparing pancreatic duct drainage and pancreatectomy have reported a higher pain-relieving effect

of pancreatic duct drainage.^{58,62} The 2009 Clinical Practice Guidelines for Chronic Pancreatitis describes a complication rate of 8% to 36% and mortality rate of 0% to 7% for pancreatic duct drainage, with corresponding rates of 10% to 32% and 0% to 4.8% for pancreatectomy.

For treatment selection, the use of minimally invasive treatments should be considered first, but the cost-effectiveness, long-term pain relief rate and reoperation rate should also be taken into account. The use of endoscopic treatment and ESWL should be considered first for patients with pancreatolithiasis in whom treatment is indicated, such as those with persistent pain, but it may be better to undertake surgical treatment at the outset in some patients considering the results of comparative studies, and it is important to identify patients who are ineligible for endoscopic treatment before the start of treatment. Surgical treatment is indicated in patients who are unresponsive to or ineligible for endoscopic treatment and ESWL. Ineligible patients include those with stones filling the pancreatic duct and those with complicating pancreatic duct strictures, pancreatic pseudocysts, internal pancreatic fistulas, or pleural effusion and ascites. In regard to selection of the surgical procedure, pancreatic duct drainage should be considered.

CQ-III-3-A. What Are the Indications for ESWL?

- ESWL of pancreatic stones is indicated in chronic pancreatitis patients with stones in the main or accessory pancreatic duct complaining of abdominal pain.
- ESWL is contraindicated in pregnant women, patients with abdominal aortic aneurysm, those with a marked bleeding tendency, and those with an implanted cardiac pacemaker.

Description

The ESWL of pancreatic stones is indicated in chronic pancreatitis patients with stones in the main or accessory pancreatic duct complaining of abdominal pain.^{63–66} The ESWL is often performed in patients with residual pancreatic endocrine and exocrine functions in whom US or CT reveals no marked pancreatic parenchymal atrophy, but it is also undertaken in asymptomatic patients in whom preservation of pancreatic function can be expected by removal of the pancreatic stone.^{44,64,65}

The ESWL is definitely indicated for pancreatic stones in the head and body of the pancreas, but it can also be performed for stones that are diffusely present from the pancreatic head to the tail. Patients with giant stones or multiple stones may require a greater number of treatments; however, additional use of endoscopic treatment may enable reduction of the treatment period. Additional use of appropriate endoscopic treatment is needed in patients with a severe stricture of the main pancreatic duct on the papillary side of the stones, because ESWL alone may leave residual fragments.^{44,65} However, endoscopic treatment may be difficult in patients with a severe stricture or tortuosity of the pancreatic duct, and it is necessary from the outset to carefully consider treatment strategies, including surgical treatment, after taking possible incidental events and the treatment period into account.⁴²

On the other hand, ESWL is contraindicated in pregnant women, patients with abdominal aortic aneurysm, those with a marked bleeding tendency, and those with implanted cardiac pacemakers.^{42,44,63–66}

CQ-III-3-B. How to Perform ESWL?

- Lithotripsy should be performed sequentially from the side of the pancreatic head, with the goal of reducing the fragment size to 3 mm or less.

- If stones do not disappear by lithotripsy or if stone clearance is prolonged, endoscopic treatments, such as endoscopic pancreatic sphincterotomy (EPST), pancreatic duct stenting or balloon dilation of stricture of the pancreatic duct should be performed.
- Sedatives or analgesics, such as pentazocine and diazepam, should be used for the pain caused by the shock waves).

Description

For actual treatment, a treatment plan should be developed using plain abdominal radiography, US, CT, MRCP, ERCP), and so on. It is necessary to check the condition of the stone(s) in the main pancreatic duct, the presence or absence of pancreatic duct strictures, and so on, in advance, by pancreatography.

There are 3 systems used to generate ESWL shock waves: electromagnetic conversion, underwater spark, and piezo systems. It has been reported that use of the piezo system was associated with a lower stone fragmentation effect than the other systems, and that the stone clearance effect in patients treated by ESWL alone was higher with the electromagnetic system than with the underwater spark system.⁴² Shock waves can be focused by US or X-ray, although technically, X-ray focusing is easier because of the lesser influence of gas in the gastrointestinal tract. It has also been reported that in patients with radiolucent and small stones, an endoscopic nasal pancreatic duct drainage catheter or a balloon catheter should be placed to perform pancreatography-guided lithotripsy.^{64,65}

In ESWL, lithotripsy from the side of the pancreatic head is considered to reduce the risk of acute pancreatitis due to impaction of fragments, which is one of the early incidental events. In each session, 2000 to 4000 shock waves are administered for 30 to 40 minutes, and 1 or 2 sessions are given weekly. Five to 6 sessions are required in many cases,^{44,65} (Fig. 8). Analgesics or sedatives, such as pentazocine and diazepam, should be used for managing the pain caused by the shock waves. It is desirable to collect blood samples 2 hours after the procedure or the following morning and to measure the serum amylase levels, considering the possible development of acute pancreatitis. Although it has been reported that endoscopic procedures, such as EPST, are not necessarily required before lithotripsy treatment,^{44,63,65} The ESWL must be performed at facilities, where endoscopic treatments, such as EPST and pancreatic duct stenting can be performed to manage acute pancreatitis due to the impaction of fragments and to remove residual stones.^{63–65}

The therapeutic effect should be evaluated by plain abdominal radiography immediately after ESWL or on the following day, with the goal of reducing the fragment size to 3 mm or less.^{44,65} If the stones do not disappear after lithotripsy or if stone clearance is prolonged, endoscopic treatments, such as EPST, pancreatic duct stenting or balloon dilation of the strictured pancreatic duct should be performed to remove residual stones.^{42,44,65} It has recently been reported that transvenous injection of secretin during ESWL facilitates the removal of fragments⁶⁷ and that endoscopic treatment at least 2 days after ESWL can also efficiently remove the fragments.⁶⁸

CQ-III-3-C. What Are Outcomes of ESWL?

- Combination treatment with ESWL plus endoscopy is extremely effective for abdominal pain in patients with pancreatolithiasis over the short term.
- Combination treatment with ESWL plus endoscopy may also be effective for abdominal pain in patients with pancreatolithiasis over the long term.

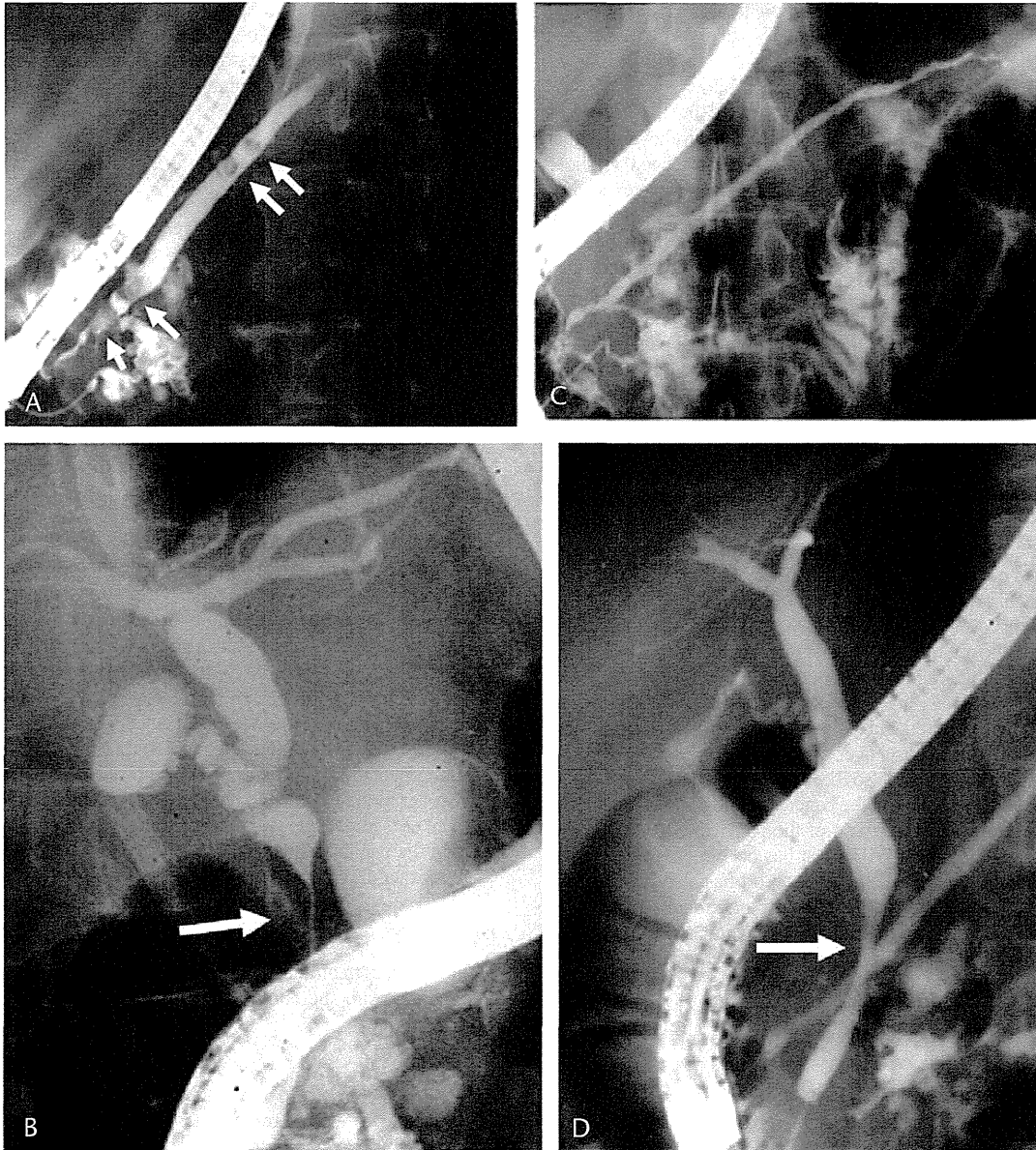


FIGURE 8. ERCP images of a patient with chronic pancreatitis. A, ERP before ESWL shows 4 stones in the main pancreatic duct (arrows). B, ERP before ESWL reveals a severe stricture of the lower common bile duct (arrow). C, ERP after ESWL (8 sessions, 14122 shock waves) shows the stones in the main pancreatic duct disappeared and the dilation of the main pancreatic duct improved. D, ERP after ESWL shows the common bile duct stricture improved (arrow).

- Combination treatment with ESWL plus endoscopy may be effective for preserving the pancreatic exocrine function in patients with pancreatolithiasis.
- There is insufficient evidence to suggest that combined treatment with ESWL plus endoscopy is effective for preserving the pancreatic endocrine function in patients with pancreatolithiasis.

Description

Many studies have reported that ESWL has a good stone fragmentation effect (80% to 100%).^{44,63-66,69} In addition, it has been reported that ESWL monotherapy led to spontaneous expulsion of the stone fragments in 49.4% to 81.8% of patients.^{42,65,69} Patients in whom it is difficult to clear stones by ESWL alone need additional endoscopic treatments, such as EPST, lithotripsy

with a basket catheter, pancreatic duct stenting, or endoscopic pancreatic duct balloon dilation.^{42,44,65,69} Additional use of these endoscopic treatments has been reported to yield good results, with complete stone clearance rates of 76% to 100%.

Many studies have investigated the effect of ESWL on abdominal pain in patients with pancreatolithiasis, including those who underwent additional endoscopic treatment, and reported that ESWL was very effective (effective in 78% to 100% of patients on a short-term basis).^{42,44,63-66,69-73} A meta-analysis using 17 published papers also revealed its efficacy.⁷⁴ In general, the use of endoscopic treatment in addition to ESWL is considered to improve the clinical effect. However, a recent randomized controlled study of ESWL alone versus concurrent ESWL plus endoscopic treatment reported almost similar outcomes between these 2 groups, showing the absence

of any add-on effect of current endoscopic treatment/stent therapy over ESWL alone, and further studies to clarify this issue are needed in the future.⁷⁵

The stone recurrence rate on long-term follow-up after ESWL has been reported to be relatively high (20% to 30%).^{44,69} Patients with strictures of the main pancreatic duct tend to have a higher stone recurrence rate and a shorter interval to recurrence than those without strictures.⁴⁴ In addition, the usefulness of pancreatic duct stenting with the aim of preventing stone recurrence after stone clearance by ESWL has not been definitively demonstrated to date.^{75,76} Regarding the effect of ESWL on clinical symptoms over the long term, 1 report has indicated that although the symptoms improved in 79% of patients during a mean observation period of 40 months, there was no difference in the abdominal pain relief rate between the cases with successful and unsuccessful treatment; thus, it is yet to be definitively demonstrated that treatment with ESWL and endoscopy is effective for improving abdominal pain in patients with pancreatolithiasis.⁷⁷ However, according to a multicenter study including the largest number (1018) of patients to date, ESWL was effective in relieving abdominal pain in 65% of patients during an observation period of 2 to 12 years (mean, 4.9 years), and patients in whom the stone removal treatment was successful also tended to be relieved of their symptoms more often.⁷⁸ Also, in a study with the longest follow-up period to date (mean, 14.4 years), clinical symptoms improved in approximately two-thirds of patients, and the number of hospitalizations was significantly reduced.⁷⁹ Studies with relatively long follow-up periods^{42,44,65,76,79} have suggested that combined ESWL plus endoscopic treatment had a relatively good abdominal pain-relieving or -reducing effect in selected patients with pancreatolithiasis over the long term.

Various studies have also been conducted on the effect of ESWL of pancreatic stones on the pancreatic endocrine and exocrine functions. Although improvement of the pancreatic exocrine function as assessed by the BT-PABA test has been reported in 60% to 77% of patients after ESWL,^{44,65,80} 1 report has also indicated the absence of any significant improvement of the exocrine function after treatment.⁸¹ In regard to the endocrine function, according to 1 report, the pancreatic endocrine function improved after ESWL in 3 (50%) of 6 patients with complicating diabetes,⁸¹ whereas several other studies have reported no obvious improvement of the glucose tolerance or insulin secretion capacity after ESWL.^{66,82}

CQ-III-3-D. What Are Incidental Events Associated With ESWL?

- Pancreatic stones can be relatively safely treated by ESWL.

Description

A basic study has shown that the shock waves in ESWL cause almost no direct histologic damage to pancreatic tissue.⁸³

The incidence of incidental events associated with ESWL treatment of pancreatic stones, including acute pancreatitis, hemorrhage into the pancreatic pseudocyst, acute cholangitis, hematuria, hepatic or renal subcapsular hematoma, headache and low back pain has been reported to be 3% to 18%.^{43,81,84–86} A multicenter questionnaire survey in Japan reported that 35 (6.3%) of 555 patients who underwent ESWL had incidental events, and that acute pancreatitis was the most common incidental event, observed in 30 patients (5.4%).⁴⁴ The survey also reported that 3 patients had jaundice likely to be caused by impaction of pancreatic stones, and that 1 patient developed acute cholangitis due to impaction of pancreatic stones followed by disseminated intravascular coagulation, resulting in death. According to another report, 1 (3%) of 31 patients who underwent ESWL developed hepatic subcapsular hematoma, which healed

with conservative treatment.⁴³ One study reported that 1 (6%) of 18 patients complained of both headache and low back pain following ESWL.⁸¹ Pancreatic stones can be treated relatively safely by ESWL while bearing in mind the risk of the above-mentioned incidental events.

CQ-III-4-A. What Are Indications for Endoscopic Treatment?

- Endoscopic treatment of pancreatic stones is indicated in chronic pancreatitis patients with stones in the main or accessory pancreatic duct complaining of abdominal pain.

Description

It is desirable for endoscopic treatment to be undertaken by practitioners with sufficient experience in endoscopic treatments, due to the high degree of skill required for the procedures.

Endoscopic treatment of pancreatic stones is indicated in chronic pancreatitis patients with stones in the main or accessory pancreatic duct complaining of abdominal pain. It is important for successful treatment that the pancreatic stones are not large or impacted. Stones with a diameter of 5 to 6 mm or less can be removed with a basket catheter without sphincterotomy, but larger stones should be removed with a basket catheter after endoscopic incision of the main or accessory papilla. Favorable conditions for endoscopic stone removal are: (1) 3 or less stones; (2) stones confined to the head and/or body of the pancreas; (3) stone diameter, 10 mm; (4) absence of stricture on the papillary side; and (5) absence of impacted stones.⁸⁷ In actual practice, endoscopic treatment is often undertaken as adjunctive therapy after fragmentation of pancreatic stones by ESWL.⁹⁹ It is necessary to additionally undertake endoscopic pancreatic duct balloon dilation, etc., in patients with severe stricture of the main pancreatic duct on the papillary side of the stones, because ESWL alone may leave residual fragments.⁸¹

CQ-III-4-B. How to Perform Endoscopic Treatment?

- Endoscopic treatments include EPST, endoscopic pancreatic stone removal, and endoscopic pancreatic duct stenting.

Description

(A) EPST

In patients with chronic pancreatitis, the main papilla is fibrotic due to chronic inflammation, and EPST should be performed in cases where the main pancreatic duct is dilated or when pancreatic stones are removed with a basket catheter. Removal of pancreatic stones after EPST was reported in 1985⁸⁸: in 1 method, a papillotome is selectively inserted in the pancreatic duct after conventional endoscopic sphincterotomy and an incision is made with a high-frequency knife; in another, the pancreatic duct orifice is directly incised (Fig. 9). Incision should not be made outside the papillary orifice protrusion, to prevent perforation (Fig. 9). An incision allows better outflow of pancreatic juice, enabling the insertion of a device for removing the pancreatic stones and also allows expulsion of stones fragmented into small pieces by ESWL. When it is difficult to perform EPST because of the shape or strictures of the main pancreatic duct, endoscopic minor papilla sphincterotomy was selected to remove pancreatic stones. The procedures of endoscopic minor papilla sphincterotomy are similar to EPST (Fig. 10).

(B) Endoscopic pancreatic stone removal

Stone removal by EPST alone is indicated only for small stones with a diameter of 5 to 6 mm or less. However, with the

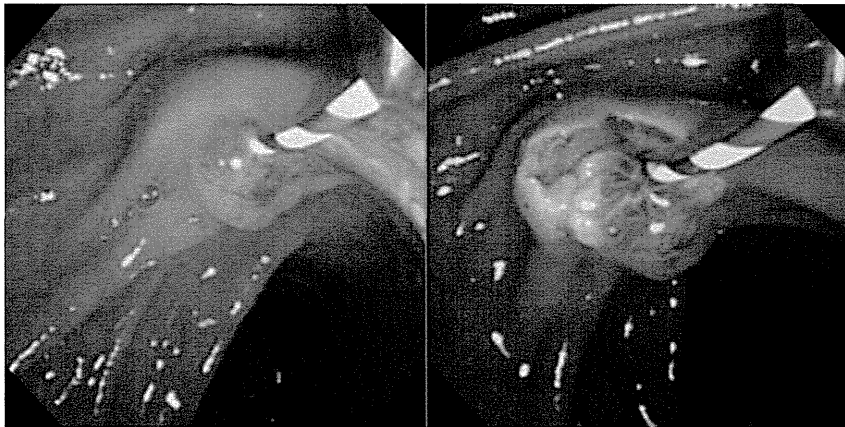


FIGURE 9. Endoscopic images during EPST. Left: the duodenal papilla from which a guidewire was inserted into the pancreatic duct. Right: after EPST, a guidewire inserted into the pancreatic duct orifice is observed.

dissemination of ESWL, EPST has come to be used often as adjunctive therapy to remove fragments. Pancreatic lithotripsy using a basket catheter for bile duct lithotripsy frequently causes incidental events, such as basket fracture,⁸⁹ and lithotripsy should be performed preferentially by ESWL. If there is a stricture on the papilla side, stones may be removed with a basket catheter after dilating the stricture with a dilator or balloon catheter (Fig. 11). There are also special methods, including pancreatoscopic laser lithotripsy.⁹⁰ In addition, there is a method in which an electrohydraulic lithotripter is inserted into a balloon catheter to impacted pancreatic stones,⁹¹ and pancreatoscopy-guided electrohydraulic lithotripter can also be performed.⁹²

(C) Endoscopic pancreatic duct stenting

Patients with pancreatolithiasis often have the complication of pancreatic duct stricture, and stent treatment for pancreatic duct strictures was first reported in 1985.⁸⁸ A 5 to 10 Fr plastic stent is advanced along a guidewire inserted into the tail side of the stricture (Fig. 12). Long-term stent placement is associated with a high frequency of resolution of pancreatic duct strictures and pain relief. In addition, treatment of pancreatic duct strictures by pancreatic duct stenting after stone removal also alleviates abdominal symptoms.⁷⁹ For severe pancreatic duct strictures, a stent should be placed after dilating the stricture with a dilatation catheter, balloon catheter, Sোধendra stent retriever, and so on. Pancreatic duct stents should be regularly replaced every 4 weeks to 3 months.^{93,94}

CQ-III-4-C. What Are Outcomes of Endoscopic Treatment?

- The complete stone clearance rate of concurrent ESWL plus endoscopic treatment is approximately 70%.

Description

In a multicenter study of 555 patients, the complete stone clearance rate was 72.6%, and the symptom improvement rate in symptomatic patients was 91.9%.⁴⁴ In a multicenter study of 899 patients from 2001 to 2005, 27.8%, 22.5%, and 8.1% of patients underwent concurrent ESWL and endoscopic treatment, ESWL alone, and endoscopic treatment alone, respectively.⁴² Patients who underwent endoscopic treatment alone had a stone clearance rate of 87.5% and symptom relief rate of 98.4%, although the stone size was 10 mm or less in many cases. Patients who underwent ESWL had a stone clearance rate of 74.9% and symptom relief rate of 91.9%, possibly because large stones and multiple stones were treated. Also, in a single-center study of more than 1000 patients, the complete stone clearance rate was 76%.⁷³

Recurrence is observed during long-term follow-up both in patients treated by endoscopic procedures and in patients treated by ESWL. In a multicenter study carried out between 2001 and 2005, the recurrence rate after endoscopic treatment (9/73, 12.3%) was lower than that after concurrent endoscopic treatment

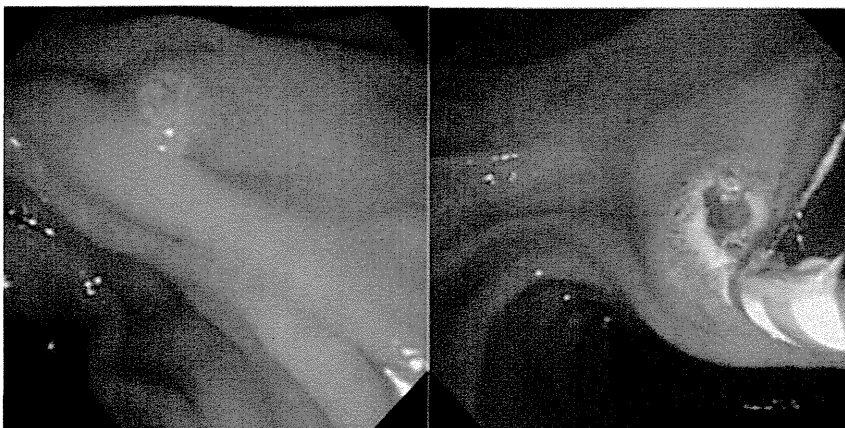


FIGURE 10. Endoscopic images during minor papillotomy. Left: the minor papilla before incision. Right: the protrusion is incised with a papillotome.



FIGURE 11. Endoscopic image during stone removal with a balloon catheter.

plus ESWL (105/474, 22.2%), but higher than that after surgical treatment (2/133, 1.5%).⁴² In addition, the incidence of multiple recurrences was higher after ESWL than after endoscopic or surgical treatment. Stone recurrence occurred within 3 years in 88 (83.8%) of 105 patients who had been treated by ESWL and

in all (9/9) patients who had received endoscopic treatment. Recurrence of abdominal pain was more common after ESWL than after endoscopic or surgical treatment.

In patients with alcoholic pancreatitis, abstinence is the most important factor influencing the likelihood of stone recurrence, whereas another important factor is the presence/absence of strictures in the main pancreatic duct. It was reported that the recurrence rate was 19% (4/21) in patients without main pancreatic duct strictures, while it was as high as 42% (5/12) in patients with strictures.⁹⁵ Likewise, it was reported that the recurrence rates were 10% (5/52) and 46% (13/28) in patients without and with main pancreatic duct strictures, respectively, and that patients with strictures tended to have early recurrence.⁸⁰ In patients with main pancreatic duct strictures, stone recurrence occurs earlier and at a higher frequency, and pancreatic duct stenting,⁷⁹ and balloon dilatation⁹⁶ have been attempted to prevent recurrence, but further studies are required to determine the effect of these procedures in preventing recurrence. In addition, the recurrence rate was reported to be significantly higher in patients younger than 65 years (14/49, 29%) than in those aged 65 years or older (0/13, 0%),⁸⁰ and careful follow-up is needed in younger patients.

CQ-III-4-D. Incidental Events Associated With Endoscopic Treatment

- Major incidental events after endoscopic treatment include acute pancreatitis, acute cholecystitis, acute cholangitis, and bleeding.

Description

Incidental events after endoscopic treatment, including acute pancreatitis, cholecystitis, pancreatic pseudocyst, cholangitis, and bleeding were observed in 9.6% of patients.⁴² In addition, basket

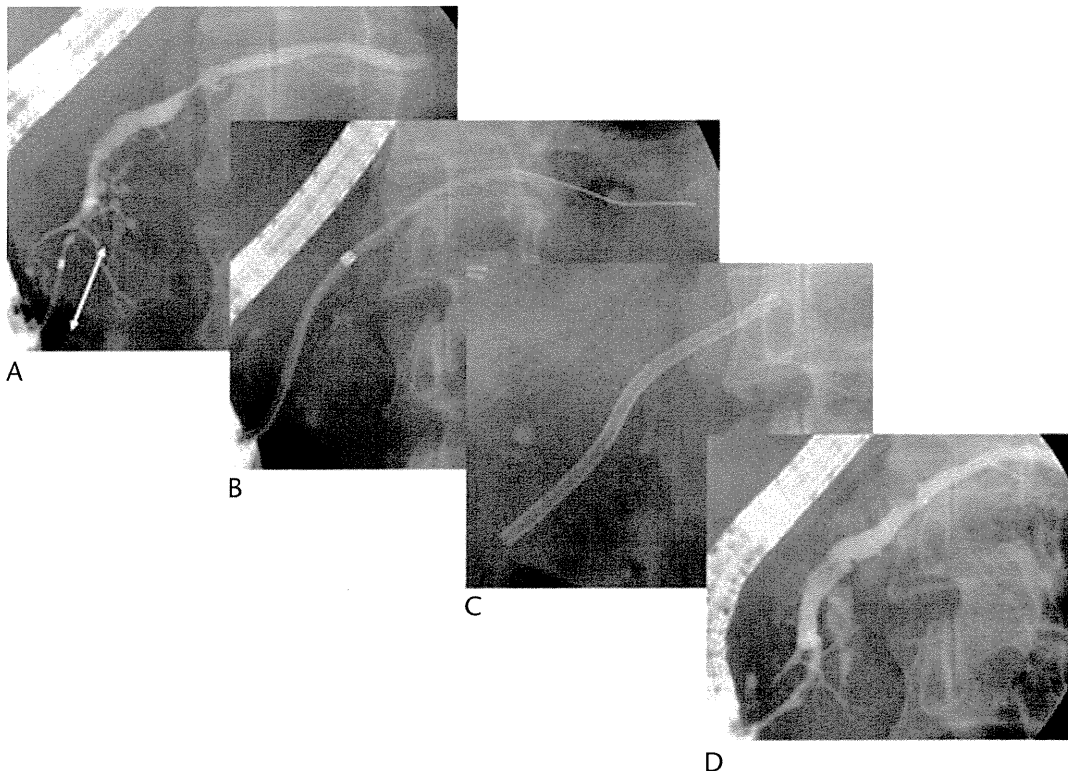


FIGURE 12. A case of chronic pancreatitis (main pancreatic duct stricture). A, Stricture of the main pancreatic duct in the head of the pancreas (↔). B, Dilatation of the main pancreatic duct with a dilator catheter for bile duct dilation. C, Placement of a pancreatic duct stent. D, 6 months later, the stricture has improved.

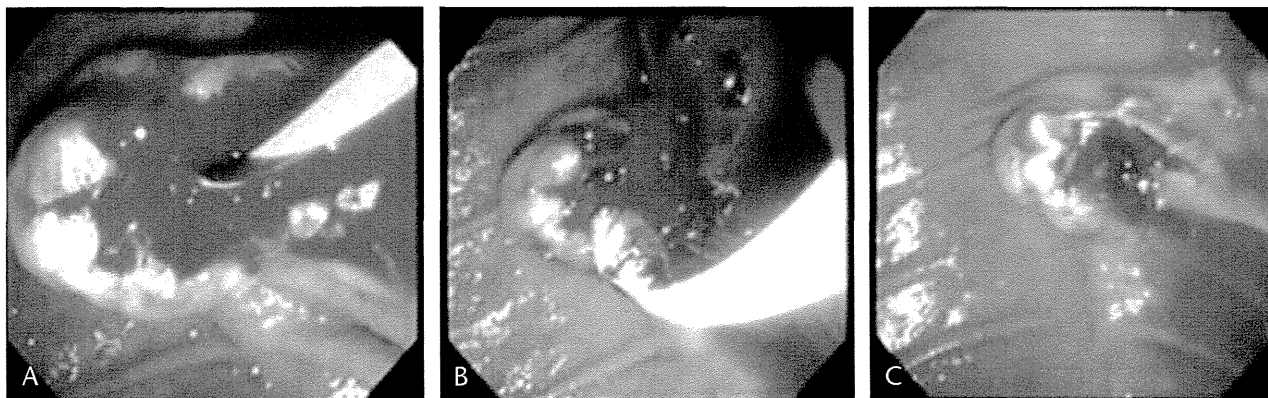


FIGURE 13. Compression hemostasis using a balloon for bile duct dilation. A, Bleeding after sphincterotomy. B, A balloon for bile duct dilation was inserted for compression hemostasis. C, Bleeding stopped in 5 minutes.

impaction and other incidental events at stone removal have also been reported.⁴⁴ Seven (9.6%) of 73 patients were reported to have early complications after endoscopic treatment alone: acute pancreatitis in 3.3% and basket impaction in 2.2%. On the other hand, according to 1 report, the incidence of incidental events was lower in patients who underwent EPST before ESWL than in those who did not.

Clip forceps, microwave coagulation ablation, local instillation, and other treatments have been used for bleeding associated

with EPST, like for bleeding associated with endoscopic sphincterotomy (Fig. 13). In addition, endoscopic pancreatic ductal drainage has been used to manage obstructive pancreatic ductitis and pancreatic abscess associated with pancreatic stone treatment.

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厚生労働省難治性疾患等克服研究事業（難治性疾患克服研究事業）
難治性膵疾患に関する調査研究班

「急性膵炎治療の診療科間・施設間差異の実態調査」に関するアンケート二次調査ご協力をお願い

拝啓

仲秋の候、先生におかれましては益々ご健勝のこととお慶び申し上げます。

さて、厚生労働省難治性疾患等克服研究事業（難治性疾患克服研究事）の難治性膵疾患に関する調査研究班の分担調査として、「急性膵炎治療の診療科間・施設間差異の実態調査」があり、私が研究の責任者を担当させていただいて降ります。

本書状は以前の「急性膵炎治療の診療科間・施設間差異の実態調査」に関する一次調査票にて御協力を頂けると、ご回答頂いた施設に送付させて頂いております。

今回の二次調査では、2014年1月～12月の1年間の急性膵炎症例の検査結果等＋重症度判定、および医事レセプトデータのDEFファイルの供出をお願いしたく存じ上げます。

本調査研究の意図をお汲み頂き、何卒ご協力の程よろしくお願い申し上げます。なお本調査に関しまして、ご不明な点などがございましたら、下記までお問い合わせ頂ければ幸いです。

末筆ながら、先生ならびに貴施設の益々のご活躍・ご発展をお祈り申し上げます。

敬具

平成 27 年 10 月 吉日

三重大学大学院医学系研究科肝胆膵・移植外科学

伊佐地 秀司

〒514-8507 三重県津市江戸橋 2 丁目 174

TEL: 059-232-1111

FAX: 059-232-8095

厚生労働科学研究
難治性疾患等政策研究事業（難治性疾患政策研究事業）
難治性膵疾患に関する調査研究班
慢性膵炎治療の実態調査ご協力のお願い（1次調査）

拝啓

時下、先生方におかれましてはますますご健勝のこととお慶び申し上げます。

さて、私ども厚生労働科学研究 難治性疾患等政策研究事業（難治性疾患政策研究事業）“難治性膵疾患に関する調査研究班”で、この度、下記の慢性膵炎治療の調査を行うこととなりました。

- ▶ 慢性膵炎による難治性疼痛に対する外科治療施行症例の検討
 - 多施設共同後向き観察研究 -
- ▶ 慢性膵炎に対する外科治療の実態調査と普及への課題解析
 - 多施設共同後向き観察研究 -

本邦における慢性膵炎に対する外科治療の報告は限られており、本研究により全国的な実態を把握することができれば、慢性膵炎に対する各種の治療法の成績が明らかになることが期待され、治療指針を作成する上で大きな役割を担うこととなると考えます。

上記の異なる主施設で計画されました2つ研究は、互いにリンクしております。そのため、調査につきましては、1つのアンケート調査票（共通の Case Report Form: CRF）で行う予定です。対象は2005年1月1日から2014年12月31日までに、慢性膵炎に対し外科治療を行った症例となります。

本研究の意図をお汲みいただき、1次調査にご協力賜りますようお願い申し上げます。先生方にはご多忙の折、誠に恐れ入りますが、同封の1次調査票にご記入の上、2015年12月28日（月）までに、FAXまたはメールでご返信頂きますようお願い申し上げます。また、本調査に関してのご質問がございましたら、下記までお問い合わせいただきますようお願いいたします。

末筆ではございますが、先生ならびに貴施設のますますのご発展を祈念いたします。

敬具

平成 27年 11月 吉日

厚生労働科学研究 難治性疾患等政策研究事業
（難治性疾患政策研究事業）
難治性膵疾患に関する調査研究班
研究代表者 竹山宜典

「慢性膵炎による難治性疼痛に対する外科治療施行症例の検討」
研究分担者 乾 和郎（藤田保健衛生大学坂文種報徳會病院消化器内科）
北野雅之（近畿大学医学部消化器内科）

「慢性膵炎に対する外科治療の実態調査と普及への課題解析」
研究分担者 伊佐地秀司，飯澤祐介（三重大学大学院肝胆膵・移植外科学）

FAX 番号：059-232-8095

E-mail：uskm007@clin.medic.mie-u.ac.jp

送信先 Fax 番号：059-232-8095

E-mail: uskm007@clin.medic.mie-u.ac.jp

三重大学肝胆膵・移植外科 飯澤あて

難治性膵疾患に関する調査研究班：一次調査票

『慢性膵炎による難治性疼痛に対する外科治療施行症例の検討』

(研究分担者：乾 和郎，北野 雅之)

『慢性膵炎に対する外科治療の実態調査と普及への課題解析』

(研究分担者：伊佐地 秀司，飯澤 祐介)

(情報収集期間：2005年1月1日から2014年12月31日)

ご所属： _____ 病院 _____ 科

連絡担当者氏名： _____ 先生

e-mail: _____

記載年月日：平成 _____ 年 _____ 月 _____ 日

- このたびの調査にご協力いただけますでしょうか？

・ はい ・ いいえ

- 2005年1月1日から2014年12月31日までに、貴科で慢性膵炎に対して外科治療を行った症例数をお教えてください。

該当症例： _____ 名

ご記入上の注意事項

1. 後日、各症例につきまして2次調査を行う予定です。ご協力をお願いします。
2. 平成27年12月28日までに、Fax または e-mail でご返送いただくようお願いいたします。

ご協力ありがとうございました。