Long-term outcomes associated with pancreatic extracorporeal shock wave lithotripsy for chronic calcific pancreatitis

Gulseren Seven, MD,[1] Mitchal A. Schreiner, MD, MPH,[1] Andrew S. Ross, MD,[1] Otto S. Lin, MD,[1] Michael Gluck, MD,[1] S. Ian Gan, MD,[1] Shayan Irani, MD,[1] John J. Brandabur, MD,[1] David Patterson, MD,[1] Christian Kuhr, MD,[2] Richard Kozarek, MD[1]

Seattle, Washington, USA

Background: Most outcomes data on pancreatic extracorporeal shock wave lithotripsy (P-ESWL) for chronic calcific pancreatitis (CCP) are based on studies with <4 years' follow-up, and U.S. long-term studies are lacking.

Objective: To report long-term P-ESWL outcomes for CCP and to assess whether smoking or alcohol use influences P-ESWL outcomes.

Design: Cross-sectional study, retrospective chart review.

Setting: Virginia Mason Medical Center, Seattle, Washington.

Patients: This study involved 120 patients who underwent P-ESWL and ERCP for CCP and completed an outcomes questionnaire.

Intervention: P-ESWL and ERCP, outcomes survey.

Main Outcome Measurements: Pain, quality of life, narcotics use, diabetes status, pancreatic enzyme requirement, repeat P-ESWL, repeat ERCP, surgery.

Results: A total of 120 patients underwent P-ESWL followed by ERCP (mean ± standard deviation [SD] follow-up 4.3 [± 3.7] years) and completed a survey. The mean (± SD) before-P-ESWL pain score was 7.9 (± 2.6) compared with 2.9 (± 2.6) after P-ESWL ($P < .001$). Improved pain was reported by 102 patients (85%); 60 (50%) reported complete pain relief and no narcotic use. The mean (± SD) before-P-ESWL quality-of-life score was 3.7 (± 2.4) compared with 7.3 (± 2.7) after P-ESWL ($P < .001$). In patients with ≥4 years' follow-up, repeat procedures included P-ESWL (29%), ERCP (84%), and surgery (16%). Smokers who quit smoking after P-ESWL had improved narcotic requirements compared with those who continued smoking (95% vs 67%; $P = .014$), and a trend suggested a decreased need for repeat ERCPs (68% vs 84%; $P = .071$).

Limitations: Single center, retrospective, recall bias, nonvalidated pain and quality-of-life scales.

Conclusion: P-ESWL as the initial therapy for CCP may lead to more lifetime procedures; however, partial pain relief in 85%, complete pain relief with no narcotic use in 50%, and avoidance of surgery in 84% of patients may be achieved. Quitting smoking after P-ESWL may improve outcomes. (Gastrointest Endosc 2012;75:997-1004.)

In 2002 our group reported the results of an analysis on the outcomes of 40 patients who underwent pancreatic extracorporeal shock wave lithotripsy (P-ESWL) for chronic calcific pancreatitis (CCP), with a mean follow-up of 2.4 years.[1] Our 2002 analysis revealed a statistically significant improvement in pain scores, hospital admissions, and narcotic pain

Abbreviations: CCP, chronic calcific pancreatitis; P-ESWL, pancreatic extracorporeal shock wave lithotripsy; PD, pancreatic duct.

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Current affiliations: The Digestive Disease Institute at Virginia Mason (1), Department of Urology (2), Virginia Mason Medical Center, Seattle, Washington, USA.

Reprint requests: Richard A. Kozarek, MD, Executive Director, Digestive Disease Institute, Virginia Mason Medical Center, 1100 9th Ave, PO Box 900, Mail Stop C3-GAS, Seattle, WA 98101.

medication use in patients who underwent this therapy. A number of studies on this same subject have also noted improvements in pain, quality of life, narcotic pain medication use, and pancreatic duct (PD) diameter.[2-13] In 2007, Cahen et al[14] published a randomized, prospective, head-to-head trial reporting superior outcomes associated with surgical drainage, compared with endoscopic drainage, of the PD in chronic pancreatitis. The majority of the patients in both arms of that study had PD stones, so the findings of this study have largely been applied to patients with CCP with intraductal stones.

Despite the results of the Cahen et al[14] study, which reported surgical drainage of the PD in chronic pancreatitis to be superior to endoscopic drainage, because of the positive outcomes associated with P-ESWL in the treatment of CCP reported at our institution and others,[1-13] P-ESWL remains an important tool for the treatment of these patients and warrants continued study. Although a wealth of data exists on after–P-ESWL outcomes, current data are based largely on studies with <4 years of follow-up, and studies based on U.S. patients are lacking. The primary aim of this study was to assess the long-term clinical outcomes associated with P-ESWL for CCP. The secondary aim was to evaluate whether or not smoking cigarettes or daily alcohol use influences P-ESWL outcomes.

Take-home Message

- In long-term follow-up after pancreatic extracorporeal shock wave lithotripsy (P-ESWL) for chronic calcific pancreatitis with intraductal stones, 85% of patients achieved at least partial pain relief, 50% of patients achieved complete pain relief with no narcotic use, and 84% avoided pancreas surgery.
- Cigarette smokers who quit smoking after P-ESWL required less narcotic medication after P-ESWL, and a trend suggested less need for follow-up ERCPs than in those who continued to smoke.

METHODS

All patients who underwent P-ESWL followed by ERCP for CCP between January 1, 1990 and November 1, 2010 at the Virginia Mason Medical Center were included. The social security death index was used to exclude all patients who were no longer living. A questionnaire was then mailed to all after–P-ESWL patients who were still living in order to collect outcomes data for measurement (Appendix, available online at www.giejournal.org). The questionnaire contained before–P-ESWL and after–P-ESWL ordinal pain and quality-of-life scale scores as well as questions on before and after P-ESWL narcotic pain medication use, cigarette smoking status (daily cigarette use), alcohol use (at least one alcoholic drink per day), diabetes status, and pancreatic enzyme supplement requirement. Both the ordinal pain and quality-of-life scales were based on a scale of 1 to 10. For the pain scale, 1 represented no pain, and 10 represented maximal pain. For the quality of life scale, 1 represented the lowest quality of life, and 10 represented the best quality of life. A section at the top of the questionnaire allowed participants to opt out of the study by checking a box and returning the survey uncompleted. If a participant did not opt out of the study within 1 month after receiving the questionnaire, consent to be contacted by telephone to complete the survey was implied if they had not already returned a completed questionnaire. A retrospective chart review was then performed on all patients who had completed a questionnaire either by mail or telephone to collect data regarding the need for follow-up procedures after the initial P-ESWL and ERCP, including repeat P-ESWL, repeat ERCP, and pancreas surgery. Additional review included demographic features, etiology of CCP, and surgical status of patients who were excluded from the study.

For our secondary analysis, we set out to determine whether cigarette smoking or daily alcohol use had an influence on our after–P-ESWL outcomes, including improvement in before and after P-ESWL pain scale scores, quality-of-life scale scores, and narcotic pain medication use as well as the percentage of patients who reported no pain and no narcotics use and the need for repeat P-ESWL, ERCP, and pancreas surgery. For smoking, we compared the following groups: (1) no smoking history versus smoking history either before P-ESWL or at present, (2) no smoking history versus prior smokers who quit after P-ESWL, (3) no smoking history versus prior smokers who were still smoking, and (4) prior smokers who quit after P-ESWL versus prior smokers who were still smoking. For alcohol use, we compared the following groups: (1) no daily alcohol use history versus daily alcohol use history either before P-ESWL or currently, (2) no daily alcohol use history versus participants with daily alcohol use before P-ESWL but who quit after P-ESWL, (3) no daily alcohol use history versus participants with daily alcohol use before P-ESWL who still used alcohol daily, and (4) participants with daily alcohol use before P-ESWL who quit after P-ESWL versus participants with daily alcohol use before P-ESWL who still used alcohol daily.

Before October 2008, P-ESWL was performed at our institution with a Dornier HM3 lithotripter (Dornier, Inc, Dornier Medtech, Munich, Germany), as previously described.[1] In October 2008, we began performing P-ESWL with a Storz Medical Modulith SLX-F2 lithotripter (Karl Storz Lithotripsy America, Inc, Kennesaw, Ga), and fragmentation was accomplished with a mean of 2312 (range 1400-3000) cycles with a mean maximum energy of 7.5 (range 6.5-8) joules. All procedures were performed with patients under general anesthesia. Two-thirds of the patients underwent ERCP immediately after P-ESWL, and one-third of the patients underwent ERCP the following day. Delaying P-ESWL for 24 hours resulted in an increased need for pain medication after P-ESWL and before