Quality of Life in Chronic Pancreatitis

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Abstract

Chronic pancreatitis (CP) is a destructive inflammatory condition that leads to progressive morphological and functional changes and is characterised by significant abdominal pain. When formally assessed, pain has been demonstrated to affect all aspects of patients' health-related quality of life (HRQL). It is widely acknowledged that, in a patient-centred healthcare system, treatment should not just measure the success of controlling symptoms, but also the effect on the patients' perceived wellbeing and HRQL. We review various HRQL assessment questionnaires used to assess patients with CP, how they have been used to assess the success of various treatment methods for CP, and the challenges in interpreting the information.

Keywords

Chronic pancreatitis, quality of life, Medical Outcome Study 36-item Short-form Health Survey, Medical Outcome Study 12-item Short-form Health Survey, European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire C-30

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Chronic pancreatitis (CP) is a destructive inflammatory condition that leads to progressive morphological and functional changes at each stage of the disease. This is manifest by recurrent episodes of mild acute pancreatitis that result pathologically in fibrosis, with associated loss of exocrine and endocrine function, causing malnutrition, diabetes and significant pain. In a half to two-thirds of cases, it is caused by persistent excessive alcohol consumption, however, in approximately one-third of cases, the aetiology is idiopathic, and caused by rarer entities in the remainder.[1] Treatment is based around three principles: optimising nutrition by pancreatic enzyme supplementation and regular dietetic review; alleviating pain using medical and surgical intervention; and controlling diabetes. Each may result in significant improvement in symptoms, however controlling pain still remains the most challenging aspect of care. Recent advances in non-surgical therapeutic modalities, in particular interventional endoscopy and radiology, have created intermediate options between medical treatment and surgery. When reviewing therapeutic options, it is imperative to ascertain the efficacy and impact of disease and treatment on patients' health-related quality of life (HRQL). Patients' HRQL is becoming increasingly important, as we seek to develop patient-centred healthcare systems, as the demand for healthcare is rising and the pressures to control spending are intensifying. There is therefore a need to quantify the impact of these therapies, which has required the development of formal tools to allow measurement of HRQL. This is particularly true for chronic diseases, for which treatments often aim to improve symptoms rather than achieve a cure or prevent death. This article will review tools used to measure HRQL and the effect of therapeutic interventions on HRQL in patients with CP.

Measuring Health-related Quality of Life

While there have been no HRQL questionnaires specifically designed for assessing patients with CP, there has been much interest in validating pre-existing questionnaires such as the Medical Outcome Study 36-item Short-form Health Survey (SF-36)[2] and the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire C-30 (EORTC QLQ-C30).[3]

The SF-36 is a generic HRQL tool that assesses eight domains of health. Two summary measurements can then be calculated for physical and mental health. Although the SF-36 was designed for population screening, and lacks the ability to document detailed, disease-specific aspects of HRQL, it is known to demonstrate reliability and validity across a diverse range of populations and diseases and is a feasible, reliable and valid measure for descriptive studies of populations of patients with CP.[2,4] The SF-36 takes on average 12 minutes to complete, limiting its use in outpatient clinic settings.[5] The SF-12 questionnaire was therefore developed, incorporating 12 questions from the SF-36.[6] Comparison of the two questionnaires, whereby the SF-12 answers were taken from answers given in the SF-36, rather than being given separately, demonstrated that there was a good correlation between the physical component summary and the mental component of these two versions of the questionnaire ($r=0.960$, $p<0.001$).[5] The minimal time required to complete the SF-12 consequently provides potential for its use as an outpatient screening tool of patients with CP. Furthermore its use in clinical research studies may lead to an improvement in prospective data collection as a less time-consuming questionnaire may encourage ongoing patient participation and thus reduce the 'dropout' rate.

The EORTC core cancer module, QLQ-C30, was initially designed to assess HRQL of patients with all types of cancer. The PAN-26 was then developed to supplement the EORTC QLQ-C30 to specifically assess patients with pancreatic cancer.[7] Both questionnaires have since been validated for use in CP.[8] Although the EORTC QLQ-C30 and QLQ-PAN26

provide additional information on the digestive effects of pancreatic disease, structured interviews of patients with CP who completed the questionnaires demonstrated important areas specific to the disease that were not covered, including guilt about alcohol consumption and the burden of abstinence.[8] We have added questions relating to these areas to create a questionnaire (QLQ-PAN28 [CP]) that can provide detailed assessment of the issues affecting patients with CP, as well as an overall estimate of quality of life.[8]

Treatment Modalities and their Effect on Health-related Quality of Life

There are inherent difficulties in comparing different studies that have used the same questionnaire because it is widely accepted that cultural and environmental differences lead to a variation in approach to disease and its impact.[8] Furthermore, assessing the relationship of pain to HRQL is problematic as pain presentation is so variable and the pain scales used in the literature are heterogeneous. Pain and a patient's perception of pain are therefore complex. However, ineffective relief of chronic pain can result in patients experiencing feelings of hopelessness and isolation.[9] The three HRQL questionnaires that have been validated in CP (SF-36, SF-12, EORTC QLQ-C30 and QLQ-PAN28 [CP]) have demonstrated that pain influences all areas of HRQL assessed.[8,10–12] A Polish study by Mokrowiecka et al. showed that pain intensity rather than frequency had the greatest effect on HRQL.[12] In contrast, Mullady et al. concluded from data derived from the 'North American Pancreatitis Study 02', that patients with CP with constant pain, regardless of severity, had higher rates of disability, hospitalisation and pain medication consumption, as well as lower HRQL scores, in comparison to patients with CP with intermittent pain.[13] However, while pain is the dominant symptom demonstrated to effect HRQL, a number of additional themes have been generated from standardised interviews with patients with CP: anxiety and depression are common, along with social isolation and concern over body image. Patients' coping strategies are influenced by the severity of physical and emotional symptoms as well as external factors such as financial problems and employment status. In addition, fatigue, fear of the future and difficulty sleeping are all significant issues affecting HRQL in CP.[8] This review now addresses how different treatment methods for CP affect HRQL, and in particular, it will focus on the treatment of pain.

Medical Management of Pain

The use of analgesic drugs to alleviate pain in CP is well described and involves a stepwise progression from simple analgesia through to the use of opiates. Narcotic addiction is a concern for clinicians managing patients with any chronic pain condition. Patients receiving opiate analgesia report worse HRQL in all function scales, as well as pain and nausea symptom scales.[8] This may be explained by greater disease activity in the patients requiring opiates. Early referral for surgery of patients with CP, whose condition has failed to respond to conservative medical treatment, may enable definitive treatment before there is a reliance on opiates.

Interest has increased in the use of antioxidants as a medical therapy for CP and the EORTC QLQ-C30 and QLQ-PAN28 (CP) have recently been used to assess response.[14–16] After correction for disease duration and cigarette smoking, it was found that patients taking antioxidant therapy had better pain scores and required less analgesia. Furthermore, global HRQL scores were significantly better than for those not taking antioxidants. The efficacy and benefits of antioxidants on HRQL in CP are being investigated in the EUROPAC2 trial: a randomised double-blind trial of antioxidants for pain relief in hereditary and idiopathic CP.

Endoscopy and Extracorporeal Shockwave Lithotripsy

Obstruction of the main pancreatic duct resulting in upstream dilatation may be managed endoscopically by ductal decompression with extracorporeal lithotripsy and/or endoscopically placed pancreatic duct stents.[17] Brand et al. assessed the effect on HRQL of extracorporeal shockwave lithotripsy (ESWL) in combination with interventional endoscopy (sphincterotomy) in 48 prospectively enrolled patients with chronic calcified pancreatitis. Forty-five per cent of patients experienced complete pain relief, 37 % partial pain relief and a significantly improved global health score was demonstrated following the procedure. Aspects of the symptom scales of the EORTC QLQ-C30 that improved the most were pain, jaundice, weight loss and fever.[18] In contrast, a number of papers have identified no difference in HRQL when assessed after previous endoscopic management.[8,10–12] One potential explanation for this is that the median duration of symptomatic disease in the Brand study was shorter (69 months; range 1–300 months) with a short length of follow up (median seven months),[18] whereas the patients in the other studies who did not demonstrate an improvement in HRQL following previous endoscopic management had a longer duration of disease. Dumonceau et al. suggested that, when endoscopy is added to ESWL, the total healthcare cost may increase without additional clinical benefit compared with ESWL alone.[19] In this randomised trial, 38 % of patients who received ESWL alone had pain relapse after two years compared with 45 % of patients who received ESWL with endoscopic drainage of the main pancreatic duct. The mean duration of hospital stay and the frequency of subsequent procedures were also lower in the ESWL group.

There is continued scepticism about the benefit of ESWL because there is evidence that surgical management and drainage may be superior to endoscopic drainage. Cahen et al. randomised 39 patients to endoscopic treatment, including lithotripsy, or to surgical pancreaticojejunostomy.[20] After 24 months, there was a significant reduction in Izbicki pain scores in the surgical group compared with the endoscopic group. Patients in the endoscopic group also required more subsequent procedures than those who underwent surgical management. We may conclude from this that ESWL and endoscopic therapy, while achieving short-term benefit, may simply delay the inevitable surgery that is required for a longer-lasting clinical benefit. In support of this theory, Nealon et al. reported on a prospective study of 143 patients with CP.[21] They demonstrated that in patients with mild to moderate CP (disease severity graded on a five-point system designed by the author), surgical pancreatic decompression stopped the progression of pancreatic functional deterioration in a high proportion of patients. They therefore concluded that early surgical intervention should be considered in selected patients. A small randomised trial within that larger series confirmed the benefit of early surgery.

Coeliac Block and Thoracoscopic Splanchnicectomy

A systematic review reported that the overall success rate in terms of pain reduction following thoracoscopic splanchnicectomy in 16 published series was 90 % for the first six months, but diminished with the length of follow-up.[22] The high success rates reported were either from a short follow-up or from application of stringent criteria for patient selection. Howard et al. analysed patients from two subsets following thoracoscopic splanchnicectomy – those who had had prior surgery or endoscopic management and those who had not.[23] The group with no prior surgical or endoscopic intervention did significantly better initially following thoracoscopic splanchnicectomy ($p<0.007$); however,

Table 1: A Summary of Published Articles Assessing Health-related Quality of Life with Less Than Three Years of Follow-up After Various Surgical Procedures Used to Treat Chronic Pancreatitis

Author and Reference	Patient Number	Surgical Procedure (Patient Number in Group)	Follow-Up in Months (Median)	HRQL Questionnaire	Administration of HRQL Questionnaire	Outcome and Comments
Bloechle[33]	25	Beger (25)	18	EORTC QLQ-C30, Spitzer's HRQL Index	• Twice before surgery • At discharge • 6 and 18 months after surgery	• Significant improvement in HRQL • The pain score decreased by 95 % ($p<0.001$)
Varghese[34]	21	Beger (21)	24	EORTC-QLQ-C30	• One after surgery	• Global HRQL score for patients with CP less than the general population • Retrospective
Witzigmann[35]	70	Beger (38) versus PD (32)	34	EORTC QLQ-C30	• Week before surgery • 2–12 and 18–24 months after surgery	• Better HRQL functional score and symptom scores in all parameters except cognitive function in the Beger group • PD performed if suspected cancer thus different pre-operative patient expectation
Izbicki[36]	42	Beger (20) versus Frey (22), randomised	18	Visual analogue pain scale, EORTC QLQ-C30	• One before surgery • One after surgery	• Global HRQL and working ability improved by 67 % and 50 % in the Beger and Frey groups • Fatigue improved significantly more in the Beger group compared with the Frey group
Izbicki[37]	61	Frey (31) versus PPPD (30), randomised	24	EORTC QLQ-C30	• One before surgery • One after surgery	• Median global HRQL improved by 200 % in the Frey group and 100 % in the PPPD group • Physical status and working ability scores improved by 67 % and 50 % in both groups
Koninger[38]	65	Beger (32) versus Berne (33), randomised	24	EORTC QLQ-C30	• One before surgery • One after surgery	• No significant difference in HRQL between the two groups
Keleman[39]	66	Beger (32), Frey (13), PPPD (21)	20.6 (Frey) 41.5 (Beger)	GIQLI	• One after surgery	• GIQLI score better following Beger compared with PPPD • Retrospective
Sohn[40]	255*	PD (96), DP (67), Puestow (52), sphincteroplasty (37), Duval (5), miscellaneous (6)	32.5	Visual analogue quality of life questionnaire	• One time point after surgery	• Improved perception of HRQL, ability to care for themselves and perception of health status • Significantly reduced pain at follow up • Decline in employment following surgery • Retrospective • Poor HRQL response rate (47 %) • Bias in age of patients responding to HRQL questionnaire (may under-represent the number of patients returning to employment
Rodriguez[41]	22	Total pancreatectomy with islet cell transplant	19	SF-36, McGill Pain Questionnaire	• One before surgery • 19 months after surgery	• Significant reduction in frequency, duration and intensity of pain • Significant increase in HRQL following procedure • Only 11 out of 22 responded to HRQL questionnaire
Sutton[42]	118	Total pancreatectomy with islet cell transplant	22**	SF-36, McGill Pain Questionnaire	• One before surgery • One after surgery	• All patients, including those still on narcotics, reported improvement in physical, emotional and overall HRQL • Population assessed presumed genetically linked CP, but not all patients underwent formal genetic testing

** 255 patients had 263 operations in total; ** mean; CP = chronic pancreatitis; DP = distal pancreatectomy; EORTC QLQ-C30 = European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire C-30; GILQI = Gastrointestinal Quality of Life Index; HRQL = health-related quality of life; PD = pancreaticoduodenectomy; PPPD = pylorus preserving pancreaticoduodenectomy; SF-36 = Medical Outcome Study 36-item Short-form Health Survey.*

Table 2: A Summary of Published Articles Assessing Health-related Quality of Life with More Than Three Years of Follow-up After Various Surgical Procedures to Treat Chronic Pancreatitis

Author and Reference	Patient Number	Surgical Procedure (Patient Number)	Follow-Up in Months (Median)	HRQL Questionnaire	Administration of HRQL Questionnaire	Outcome and Comments
Mobius[43]	51	PD (24) versus Beger (27)	63.5	EORTC QLQ-C30	• Before surgery • Shortly after surgery • Five years after surgery	• Significantly improved HRQL in Beger group
King[44]	72*	PPPD (40), Frey (16), DP (1), other (18)	72**	SF-36, EORTC QLQ-C30 and PAN-26	• One after surgery	• Significantly improved HRQL scores compared with 'historical controls' in the EORTC QLQ-C30 • Only 45 % of patients completed HRQL questionnaires • Retrospective
Strate[45]	61	PPPD (30) versus Frey (31)	84	EORTC QLQ-C30	• After surgery	• There were no differences in HRQL between both groups • 47 patients followed up for seven years
Strate[46]	74	Beger (38) versus Frey (36), randomised	104	EORTC QLQ-C30	• One early and late follow up after surgery	• No significant difference in HRQL between procedures • 26 patients professionally rehabilitated • 51 patients completed HRQL questionnaire
Müller[47]	40	Beger (20) versus PPPD (20)	84 and 168	EORTC QLQ-C30	• One before surgery • One at seven years after surgery • One at 14 years after surgery	• No difference in global health status or score on any of the functional scales of the EORTC QLQ-C30 at 7- and 14-year follow up, and results similar to those of a normal German adult population (see *Table 2*)
Behrman[48]	35	Total pancreatectomy (7), other (28)	46**	SF-36	• One after surgery	• HRQL diminished in patients with CP despite surgery compared with normal gender-matched controls • Very heterogeneous population having a number of different surgeries • Retrospective
Schnelldorfer[49]	372	Lateral PJ (184), PD (97), DP (91)	66	SF-36	• One after surgery	• Half the patients continued to experience persistent pain • HRQL scores indicated that some benefit was obtained from surgery • Retrospective
Kalady[50]	60	Lateral PJ (60) versus controls (debridement and laparoscopic cholecystectomy)	38	SF-36	• One after surgery	• Overall physical and mental HRQL scores were diminished in patients with CP compared with controls • Appropriateness of control population? • Retrospective

** 72 patients had 75 operations in total; ** mean; CP = chronic pancreatitis; DP = distal pancreatectomy; EORTC QLQ-C30 = European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire C-30; HRQL = health-related quality of life; PD = pancreaticoduodenectomy; PPPD = pylorus preserving pancreaticoduodenectomy; SF-36 = Medical Outcome Study 36-item Short-form Health Survey.*

after a median follow-up of 32 months, 38 of 55 patients (69 %) reported a return of abdominal pain. Despite discouraging results in the literature, it should be noted that, in one study, two-thirds of patients replied that they would have a splanchnicectomy again and thought that the pain relief they experienced, albeit short-term, was worthwhile.[24] Perhaps one could conclude that this procedure, which is not without its risks, may be delaying the inevitable step to requiring pancreatic surgery, although it may still be suitable for some selected patients, in particular those who are unsuitable for major abdominal surgery.

Less well reported in the literature are results from coeliac plexus block. One study compared neurolytic coeliac plexus block with thoracoscopic splanchnicectomy.[25] Two different HRQL assessments were used to measure outcomes between the two groups so a meta-analytical approach was taken. The effect on social wellbeing and emotional support was significantly higher in the coeliac plexus block group compared with the thoracoscopic splanchnicectomy group. The authors hypothesise that this may be because the coeliac plexus block was the first intervention available, whereas the patients in the thoracoscopic

splanchnicectomy group had a longer duration of chronic pain and had had previous intervention. Both interventions resulted in significantly reduced pain and opiate requirements; however, it is difficult to draw conclusions from this study about the long-term effect of coeliac plexus block as patients were only followed up for eight weeks after treatment.

Exocrine and Endocrine Insufficiency

The destruction of exocrine tissue along with secondary inactivation of enzymes and bile acid, with reduced delivery of bicarbonate to the duodenum, results in maldigestion. Other factors including poor oral intake due to pain or excessive alcohol consumption compound the situation further, culminating in malnutrition.[26] Pancreatic enzyme replacement therapy (PERT) improves digestion and therefore reduces steatorrhoea and the loss of fat-soluble vitamins. It has been proposed that PERT may also reduce pain associated with CP, potentially through suppression of cholecystokinin-releasing peptide. Another possible mechanism for pain (or abdominal discomfort) in malabsorption is colonic distension due to the accumulation of bulky stools. Ten randomised controlled trials from 1965 to 2009 were included in a recent Cochrane review to evaluate the effect of PERT. Although some of the individual studies reported improved abdominal pain and reduced steatorrhoea, the heterogeneity of the studies prevented the pooling of results.[26] The majority of the trials had small numbers of patients and only short-term follow-up data, and only one trial measured HRQL as an outcome.[27] However, this trial did not meet the inclusion criteria of the Cochrane review but concluded that HRQL, pain and steatorrhoea were improved following PERT and that working ability and financial strain were significantly improved.

Numerous studies have demonstrated a correlation between low body mass index and reduced HRQL, including both physical and mental domains.[10–12] This highlights the importance of treating maldigestion adequately. Even when PERT has been prescribed, it has to be considered that adherence to treatment and appropriate usage may be an issue in a significant number of patients. Domínguez-Muñoz and Iglesias-García identified that a clinical response to PERT, including a reduction in steatorrhoea, does not necessarily imply adequate nutrition.[28] Trials addressing long-term outcome and HRQL are required to draw definitive conclusions. Malnutrition may therefore be a significant issue requiring ongoing dietetic review and education even if symptoms have improved. Diabetes mellitus (DM) complicates CP in approximately one-third of cases and is an independent risk factor for mortality.[29,30] DM in association with CP is particularly unpredictable and is frequently associated with hypoglycaemic episodes.[31] This is largely attributable to unopposed insulin action with a reduced basal level of glucagon, although increased intestinal transit with associated carbohydrate malabsorption, potential concomitant hepatic impairment and poor compliance with lifestyle changes and medication may also contribute.[32] Studies have reported that DM significantly impairs HRQL in the physical and/or mental domains of the SF-36 and EORTC QL Q-C30 assessments.[10,11] It is clear that attention to exocrine function and nutrition, and the involvement of dieticians, diabetologists and specialist nurses, is important in improving long-term outcomes and a patient's HRQL.

The Role of Surgery

Surgery for CP has progressed from radical to duodenum-preserving surgery, which is beneficial for digestion, nutrition and glucose metabolism. The Whipple procedure (pancreaticoduodenectomy)[51] was long established as being effective for the management of the complications of CP; however, the duodenum-preserving pancreatic head resection (Beger procedure) was subsequently introduced as subtotal resection of the pancreatic head and preservation of the duodenum allows normal food passage and insulin secretion. A number of studies have used HRQL questionnaires to measure outcome (see *Tables 1 and 2*), with the EORTC QLQ-C30 questionnaire being used more frequently than the SF-36. The Beger procedure has been shown to be superior to pancreaticoduodenectomy (PD) and pylorus preserving pancreaticoduodenectomy (PPPD) in improving HRQL, although the follow-up period has often been short.[35,39] Interestingly, in a study with longer follow-up (7 and 14 years), the superiority of the Beger procedure over PD and PPPD in terms of HRQL diminished over time.[47]

The Frey procedure involves local pancreatic head resection with longitudinal pancreaticojejunostomy. This procedure was found to be superior to PPPD in terms of HRQL outcome in the short term in a study by Izbicki et al.[36]; however the Beger procedure was shown to demonstrate superiority over the Frey procedure in relieving patient fatigue.[37] Again, the benefit of the Frey procedure over PPPD, and the Beger procedure over the Frey procedure was not demonstrated in the long term after 84 and 104 months of follow-up, respectively.[45,46,48] Although there are a lot of HRQL data comparing two procedures, there is limited evidence of surgical procedures compared with controls in patients with CP who have not had surgery. A number of studies have been retrospective, with associated bias, or have only administered questionnaires postoperatively, making it difficult to determine any improvement in HRQL after surgery.[34,39,40,44,49,50] However, it should be considered that it would be difficult to prospectively collect data for a population of patients with CP over a long period of time. Also of note is that some patients in the above studies had a PD due to suspected malignancy, and were then later found to have CP following histological examination of the resection specimen.[35] The relief of the patients and their expectations after receiving a benign diagnosis are likely to have affected their perception of HRQL, and should be acknowledged when interpreting the results. To further complicate matters, a significant hindrance to comparing studies is the relatively large number of patients who did not complete the HRQL questionnaires, with several studies reporting a lack of response of more than 50 %.[40,41] Perhaps a shorter questionnaire such as the SF-12 could increase response rate and lead to improved prospective data collection. A number of studies assessing factors associated with HRQL in patients with chronic pancreatitis concluded that surgery and previous endoscopic treatment had no benefit on HRQL.[8,10,11] The likely explanation for this finding may be the difference in duration of follow-up among studies and the selection of patients. For conclusions to be made, more randomised controlled trials are required with larger populations and long-term follow up.

Alternative Therapies

Stress reduction and anxiety management programmes can be useful for patients with chronic disease.[52]. There has been one controlled trial exploring the use of yoga as an intervention for the management of CP.[53] The results implied that mindfulness and meditation-based exercises significantly improved overall HRQL, stress symptoms, mood changes, appetite and alcohol dependency. While acknowledging that with only a 12-week follow up there are limitations to this study, it does suggest that clinicians should remain open to complementary therapies that may improve a patient's HRQL.

Psychology and Health-related Quality of Life

Each patient's psychological approach to chronic disease may explain the variability of perceived HRQL among patients with similar symptoms

and stage of disease. The 'self-regulatory theoretical framework' conceptualises factors influencing patients' behaviours and judgement, including cognitive representation of the threat of the disease, the emotional reaction to the disease, the coping mechanisms the patient uses to deal with the emotions created from the disease threat, and finally, the patient's contextual factors, e.g., social roles.[54]

Psychologists have been employed in varying multidisciplinary teams managing patients with chronic disease, and may help patients to cope with disease burden. Furthermore, a better understanding of psychological factors affecting a patient may reveal why certain patients will not complete HRQL questionnaires. Pezzilli et al. have best characterised the patients who declined to complete HRQL questionnaires as being men, smokers, those with a long duration of alcohol consumption and patients free of pain.[10]

Socioeconomic Impact

HRQL and the socioeconomic impact of disease are interlinked. A number of studies have identified that socioeconomic concerns affect younger patients more than older patients, leading to worse HRQL.[10,11] Wehler et al. demonstrated that unemployment and early retirement due to disease burden were significant independent predictors of deterioration in most HRQL domains.[11] Lack of employment has also been shown to have a negative influence on nausea, vomiting, insomnia and pancreatic pain.[12] The importance of social rehabilitation in patients with CP and its effect on HRQL domains should therefore not be underestimated. It could be argued that return to employment should be considered as an important part of follow-up assessment and outcome following interventions.

Conclusions

Patients with CP have a significantly impaired HRQL that affects all aspects of life. Treatment of such patients should therefore encompass a multidisciplinary approach that is patient centred and focuses not just on improving symptoms but also on social wellbeing. We believe that HRQL questionnaires represent useful clinical tools that may help to identify patients with the greatest needs. The choice of instrument will be dictated by the aims of each study – the investigator can choose between short, less sensitive HRQL assessments or longer questionnaires that provide more detailed information specific to the disease. Studies to date that have addressed the impact of different therapies on HRQL in CP have demonstrated that there is heterogeneity among results that may not be applicable to all populations. It is clear that a number of treatments are beneficial to patients; however, clinicians should be aware of the lack of evidence on long-term outcomes in improving HRQL. ■

1. Jupp J, Fine D, Johnson CD, The epidemiology and socioeconomic impact of chronic pancreatitis, *Best Pract Res Clin Gastroenterol*, 2010;24:219–31.
2. McHorney CA, Ware JE, Jr, Raczek AE, The MOS 36-Item Short-Form Health Survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental health constructs, *Med Care*, 1993;31:247–63.
3. Aaronson NK, Ahmedzai S, Bergman B, et al., The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology, *J Natl Cancer Inst*, 1993;85:365–76.
4. Wehler M, Reulbach U, Nichterlein R, et al., Health-related quality of life in chronic pancreatitis: a psychometric assessment, *Scand J Gastroenterol*, 2003;38:1083–9.
5. Pezzilli R, Morselli-Labate AM, Frulloni L, et al., The quality of life in patients with chronic pancreatitis evaluated using the SF-12 questionnaire: a comparative study with the SF-36 questionnaire, *Dig Liver Dis*, 2006;38:109–15.
6. Ware J, Jr, Kosinski M, Keller SD, A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity, *Med Care*, 1996;34:220–33.
7. Fitzsimmons D, Johnson CD, George S, et al., Development of a disease specific quality of life (QoL) questionnaire module to supplement the EORTC core cancer QoL questionnaire, the QLQ-C30 in patients with pancreatic cancer. EORTC Study Group on Quality of Life, *Eur J Cancer*, 1999;35:939–41.
8. Fitzsimmons D, Kahl S, Butturini G, et al., Symptoms and quality of life in chronic pancreatitis assessed by structured interview and the EORTC QLQ-C30 and QLQ-PAN26, *Am J Gastroenterol*, 2005;100:918–26.
9. Thomas SP, A phenomenologic study of chronic pain, *West J Nurs Res*, 2000;22:683–99; discussion 699–705.
10. Pezzilli R, Morselli Labate AM, Ceciliato R, et al., Quality of life in patients with chronic pancreatitis, *Dig Liver Dis*, 2005;37:181–9.
11. Wehler M, Nichterlein R, Fischer B, et al., Factors associated with health-related quality of life in chronic pancreatitis, *Am J Gastroenterol*, 2004;99:138–46.
12. Mokrowiecka A, Pinkowski D, Malecka-Panas E, et al., Clinical, emotional and social factors associated with quality of life in chronic pancreatitis, *Pancreatology*, 2010;10:39–46.
13. Mullady DK, Yadav D, Amann ST, et al., Type of pain, pain-associated complications, quality of life, disability and resource utilisation in chronic pancreatitis: a prospective cohort study, *Gut*, 2011;60:77–84.
14. Uden S, Bilton D, Nathan L, et al., Antioxidant therapy for recurrent pancreatitis: placebo-controlled trial, *Aliment Pharmacol Ther*, 1990;4:357–71.
15. Braganza JM, Schofield D, Snehalatha C, et al., Micronutrient antioxidant status in tropical compared with temperate-zone chronic pancreatitis, *Scand J Gastroenterol*, 1993;28:1098–104.
16. Shah NS, Makin AJ, Sheen AJ, et al., Quality of life assessment in patients with chronic pancreatitis receiving antioxidant therapy, *World J Gastroenterol*, 2010;16:4066–71.
17. Mariani A, The quality of life in chronic pancreatitis: the endoscopist's point of view, *JOP*, 2006;7:117–19.
18. Brand B, Kahl M, Sidhu S, et al., Prospective evaluation of morphology, function, and quality of life after extracorporeal shockwave lithotripsy and endoscopic treatment of chronic calcific pancreatitis, *Am J Gastroenterol*, 2000;95:3428–38.
19. Dumonceau JM, Costamagna G, Tringali A, et al., Treatment for painful calcified chronic pancreatitis: extracorporeal shock wave lithotripsy versus endoscopic treatment: a randomised controlled trial, *Gut*, 2007;56:545–52.
20. Cahen DL, Gouma DJ, Nio Y, et al., Endoscopic versus surgical drainage of the pancreatic duct in chronic pancreatitis, *N Engl J Med*, 2007;356:676–84.
21. Nealon WH, Thompson JC, Progressive loss of pancreatic function in chronic pancreatitis is delayed by main pancreatic duct decompression. A longitudinal prospective analysis of the modified puestow procedure, *Ann Surg*, 1993;217:458–66; discussion 466–8.
22. Baghdadi S, Abbas MH, Albouz F, et al., Systematic review of the role of thoracoscopic splanchnicectomy in palliating the pain of patients with chronic pancreatitis, *Surg Endosc*, 2008;22:580–8.
23. Howard TJ, Swofford JB, Wagner DL, et al., Quality of life after bilateral thoracoscopic splanchnicectomy: long-term evaluation in patients with chronic pancreatitis, *J Gastrointest Surg*, 2002;6:845–52; discussion 853–4.
24. Maher JW, Johlin FC, Heitshusen D, Long-term follow-up of thoracoscopic splanchnicectomy for chronic pancreatitis pain, *Surg Endosc*, 2001;15:706–9.
25. Basinski A, Stefaniak T, Vingerhoets A, et al., Effect of NCPB and VSPL on pain and quality of life in chronic pancreatitis patients, *World J Gastroenterol*, 2005;11:5010–14.
26. Shafiq N, Rana S, Bhasin D, et al., Pancreatic enzymes for chronic pancreatitis, *Cochrane Database Syst Rev*, 2009;(4):CD006302.
27. Czako L, Takacs T, Hegyi P, et al., Quality of life assessment after pancreatic enzyme replacement therapy in chronic pancreatitis, *Can J Gastroenterol*, 2003;17:597–603.
28. Domínguez-Muñoz JE, Iglesias-García J, Oral pancreatic enzyme substitution therapy in chronic pancreatitis: is clinical response an appropriate marker for evaluation of therapeutic efficacy?, *JOP*, 2010;11:158–62.
29. Levy P, Barthet M, Mollard BR, et al., Estimation of the prevalence and incidence of chronic pancreatitis and its complications, *Gastroenterol Clin Biol*, 2006;30:838–44.
30. Levy P, Milan C, Pignon JP, et al., Mortality factors associated with chronic pancreatitis. Unidimensional and multidimensional analysis of a medical-surgical series of 240 patients, *Gastroenterology*, 1989;96:1165–72.
31. Linde J, Nilsson LH, Barany FR, Diabetes and hypoglycemia in chronic pancreatitis, *Scand J Gastroenterol*, 1977;12:369–73.
32. Czako L, Hegyi P, Rakonczay Z, Jr, et al., Interactions between the endocrine and exocrine pancreas and their clinical relevance, *Pancreatology*, 2009;9:351–9.
33. Bloechle C, Izbicki JR, Knoefel WT, et al., Quality of life in chronic pancreatitis—results after duodenum-preserving resection of the head of the pancreas, *Pancreas*, 1995;11:77–85.
34. Varghese TK, Bell RH, Jr, Duodenum-preserving head resection for chronic pancreatitis: an institutional experience and national survey of usage, *Surgery*, 2007;142:588–93; discussion 593 e1–3.
35. Witzigmann H, Max D, Uhlmann D, et al., Outcome after duodenum-preserving pancreatic head resection is improved compared with classic Whipple procedure in the treatment of chronic pancreatitis, *Surgery*, 2003;134:53–62.
36. Izbicki JR, Bloechle C, Knoefel WT, et al., Duodenum-preserving resection of the head of the pancreas in chronic pancreatitis. A prospective, randomized trial, *Ann Surg*, 1995;221:350–8.
37. Izbicki JR, Bloechle C, Broering DC, et al., Extended drainage versus resection in surgery for chronic pancreatitis: a prospective randomized trial comparing the longitudinal pancreaticojejunostomy combined with local pancreatic head excision with the pylorus-preserving pancreatoduodenectomy, *Ann Surg*, 1998;228:771–9.
38. Koninger J, Seiler CM, Sauerland S, et al., Duodenum-preserving pancreatic head resection – a randomized controlled trial comparing the original Beger procedure with the Berne modification (ISRCTN No. 50638764), *Surgery*, 2008;143:490–8.
39. Kelemen D, Horvath OP, Clinical experience with different techniques of pancreatic head resection for chronic pancreatitis, *Dig Surg*, 2002;19:28–34; discussion 34–5.
40. Sohn TA, Campbell KA, Pitt HA, et al., Quality of life and long-term survival after surgery for chronic pancreatitis, *J Gastrointest Surg*, 2000;4:355–64; discussion 364–5.
41. Rodriguez Rilo HL, Ahmad SA, D'Alessio D, et al., Total pancreatectomy and autologous islet cell transplantation as a means to treat severe chronic pancreatitis, *J Gastrointest Surg*, 2003;7:978–89.
42. Sutton JM, Schmulewitz N, Sussman JJ, et al., Total pancreatectomy and islet cell autotransplantation as a means of treating patients with genetically linked pancreatitis, *Surgery*, 2010;148:676–85; discussion 685–6.
43. Mobius C, Max D, Uhlmann D, et al., Five-year follow-up of a prospective non-randomised study comparing duodenum-preserving pancreatic head resection with classic Whipple procedure in the treatment of chronic pancreatitis, *Langenbecks Arch Surg*, 2007;392:359–64.
44. King JC, Abeywardina S, Farrell JJ, et al., A modern review of the operative management of chronic pancreatitis, *Am Surg*, 2010;76:1071–4.
45. Strate T, Bachmann K, Busch P, et al., Resection vs drainage in treatment of chronic pancreatitis: long-term results of a randomized trial, *Gastroenterology*, 2008;134:1406–11.
46. Strate T, Taherpour Z, Bloechle C, et al., Long-term follow-up of a randomized trial comparing the beger and frey procedures for patients suffering from chronic pancreatitis, *Ann Surg*, 2005;241:591–8.
47. Müller MW, Friess H, Martin DJ, et al., Long-term follow-up of a randomized clinical trial comparing Beger with pylorus-preserving Whipple procedure for chronic pancreatitis, *Br J Surg*, 2008;95:350–6.
48. Behrman SW, Mulloy M, Total pancreatectomy for the treatment of chronic pancreatitis: indications, outcomes, and recommendations, *Am Surg*, 2006;72:297–302.
49. Schnelldorfer T, Lewin DN, Adams DB, Operative management of chronic pancreatitis: longterm results in 372 patients, *J Am Coll Surg*, 2007;204:1039–45; discussion 1045–7.
50. Kalady MF, Broome AH, Meyers WC, et al., Immediate and long-term outcomes after lateral pancreaticojejunostomy for chronic pancreatitis, *Am Surg*, 2001;67:478–83.
51. Frey CF, Smith GJ, Description and rationale of a new operation for chronic pancreatitis, *Pancreas*, 1987;2:701–7.
52. Caroleo OO, AIDS: meeting the needs through therapeutic recreation, *Ther Recreation*, 1988;22:71–8.
53. Sareen S, Kumari V, Gajebasia KS, et al., Yoga: a tool for improving the quality of life in chronic pancreatitis, *World J Gastroenterol*, 2007;13:391–7.
54. tLlewellyn CD, McGurk M, Weinman J, Head and neck cancer: to what extent can psychological factors explain differences between health-related quality of life and individual quality of life?, *Br J Oral Maxillofac Surg*, 2006;44:351–7.