American Journal of Obstetrics and Gynecology (2006) **195**, 591–600

ELSEVIER

American Journal of Obstetrics & Gynecology

www.ajog.org

Long-term outcomes after surgical and nonsurgical management of chronic pelvic pain: One year after evaluation in a pelvic pain specialty clinic

Georgine Lamvu, MD, MPH,[a,*] Rachel Williams, PhD,[b] Denniz Zolnoun, MD, MPH,[a] Mary E. Wechter, MD,[a] Anne Shortliffe, RN,[a] Grace Fulton, BS,[a] John F. Steege, MD[a]

Division of Advanced Laparoscopy and Pelvic Pain, Department of Obstetrics and Gynecology,[a] University of North Carolina School of Medicine, Chapel Hill, NC; and Department of Epidemiology,[b] University of North Carolina School of Public Health, Chapel Hill, NC

Received for publication December 15, 2005; revised March 2, 2006; accepted March 19, 2006

KEY WORDS
Chronic pelvic pain
Depression
Treatments
Long-term outcomes

Objective: The purpose of this study was to describe long-term outcomes for women with chronic pelvic pain (CPP) after evaluation in a CPP specialty clinic.
Study design: This was a prospective observational cohort study of women treated for CPP at the UNC Pelvic Pain clinic between 1993 and 2000. The primary outcome was improvement in pain and the main exposure was treatment group: primarily medical (pharmacotherapy, psychotherapy, physical therapy, or combinations of the 3) or surgical (hysterectomy, resection or ablative procedures, oophrectomy, diagnostic surgery, pain mapping, vulvar or vestibular repair). Univariate, bivariate, and multivariable analyses were performed to look for relationships between background characteristics, treatment group, and improvement in pain.
Results: Of 370 participants; 189 had surgical treatment and 181 had medical treatment. One year after evaluation, 46% reported improvement in pain and 32% improvement in depression. Improvement in pain was similar in both treatment groups and odds of improvement were equal even after adjusting for background characteristics, psychosocial comorbidity, and previous treatments.
Conclusion: One year after evaluation in a CPP specialty clinic, women experienced modest improvements in pain and depression after recommended surgical or nonsurgical treatment.

Rachel E. Williams presently works at Glaxo SmithKline (GSK) and owns stock in GSK, but her participation in this study occurred when she was affiliated with UNC and before she began working for GSK.

Presented at the Sixty-Eighth Annual Meeting of the South Atlantic Association of Obstetricians and Gynecologists, Orlando, FL, January 29-February 1, 2006.

* Reprint requests: Dr. Georgine Lamvu, Department of Obstetrics and Gynecology, University of North Carolina at Chapel Hill, 101 Manning Drive, CB 7570 MacNider Building, Chapel Hill, NC 27599-7508.
E-mail: glamvu@med.unc.edu

0002-9378/$ - see front matter © 2006 Mosby, Inc. All rights reserved.
doi:10.1016/j.ajog.2006.03.081

Chronic pelvic pain (CPP) is a poorly defined disorder that affects approximately 15% of women.[1] It is the primary indication for an estimated 40% of diagnostic laparoscopies, 10% of hysterectomies, and it accounts for more than 2 billion dollars in health care costs annually.[1,2] In spite of the high prevalence and health care costs associated with this disorder, CPP remains poorly understood and largely understudied.

Commonly, CPP is defined as noncyclic pain of at least 6 months duration, localized to the pelvis, anterior abdominal wall, at or below the umbilicus and lower back and buttocks. Pain levels are quantified as severe enough to cause disability and require medical care but are often unresponsive to treatment.[2-6] CPP may arise from 1 or more organ systems and is often associated with psychologic disturbances (depression, anxiety), a history of sexual and physical abuse, and a variety of somatic complaints.[7] This complexity makes patients with CPP difficult to evaluate, diagnose, and treat.

Treatment options for women with CPP vary from medical to surgical interventions. Surgical treatments range from diagnostic laparoscopy, resection of endometriosis, and neuroablative procedures, to partial resection of pelvic organs or full hysterectomy.[7,8] Medical treatments commonly include hormonal suppression of the ovarian cycle, pain medications, physical therapy, and cognitive-behavioral therapy or psychotherapy. Multidisciplinary diagnostic and management strategies are described in the literature, but little is published about long-term outcomes of treatment in women with CPP.

Our goals were to: (1) describe long-term outcomes, specifically related to pain and depression, among women undergoing multidisciplinary treatment in a CPP clinic; (2) determine if a variety of psychosocial patient characteristics are associated with outcomes; and (3) determine whether there is an association between improvement in pain levels and the type of primary treatment received.

Material and methods

Study setting and study population

Between June 1993 and December 2000, the UNC Pelvic Pain Clinic evaluated 987 women referred predominately from North Carolina. Patient evaluation and data collection methods have been previously published.[9,10] The UNC Institutional Review Board approved the use of clinical data for research purposes.

Before examination, patients answered self-administered written questionnaires including a general medical information form, a history of physical abuse survey, the Beck Depression Inventory, and the McGill Pain Questionnaire.[11,12] The 3 physicians involved collected information on previous surgeries, current and past treatments, and performed a complete examination. Their findings, diagnostic impressions, and recommended treatments (medications, surgeries, referrals), as well as subsequent treatments, surgeries, and pathology diagnoses were all recorded. Recommended treatments included surgical, medical (pain management, physical therapy, or psychotherapy), or combination therapy. One year after the initial evaluation, patients were again asked to complete the McGill Pain Questionnaire and the Beck Depression Inventory; 370 women completed these questionnaires.

Data collection

Patient information was abstracted from standardized clinical history forms, questionnaires, and patient medical records and entered into a SAS database (SAS, Cary, NC).

Data collection was limited to women with self-reported pelvic pain lasting 6 months or longer, although it was possible for a patient to be referred for pelvic pain lasting less than 6 months.[9,10] The pain was usually localized to 1 or more of the following anatomic areas: abdomen (below the umbilicus), pelvic organs (ovaries, uterus, urethra, bladder, pelvic floor muscles), lower back, vulva, or vagina. Clinical diagnoses were grouped as "yes" if the physician indicated that the diagnosis was definite or probable and "no" if the physician indicated that the diagnosis was not probable, did not apply to the patient, or was only "possible." If necessary, the diagnoses were confirmed using records from subsequent visits. Clinical diagnoses included muscular back pain, pelvic floor tension myalgia, endometriosis, pyriformis syndrome, vaginismus, pelvic congestion syndrome, myofascial syndrome, adhesions, adenomyosis, fibroids, urethral syndrome, pelvic floor relaxation, vulvodynia, and vulvar vestibulitis syndrome. Information on previous diagnoses and surgeries was collected in a similar manner. Thus, the total number of previous surgeries was generated based on medical record, patient report, and confirmation that the surgery was performed for the same pain that ended in referral to the UNC CPP clinic.

Pain location was described by patients and included: left, right, or middle pelvic area; low back; vaginal opening; deep vagina; high in the pelvis near the navel or in the thighs. These locations were grouped to create the variable "total number of pain sites" because many women reported more than 1 location of pain. Pain levels were measured using the McGill Pain Questionnaire (MPQ), a validated written self-questionnaire for measuring sensory and affective components of pain.[12]

History of abuse included adult or child sexual abuse, rape at any age, adult physical abuse, or traumatic discipline during childhood. Depression was measured with the Beck Depression Inventory (BDI), which classifies patients as not depressed, minimally depressed, moderately depressed, and severely depressed.[11]

Additional background characteristics collected for each patient included age, self-described race, income, educational level, and marital status.

Treatments

Medical treatments included analgesics (opioid and nonopioid), antidepressants, anti-anxiety/sedative-hypnotic/anticonvulsant, estrogens, progestins, combination estrogens and progestins, injectable progestins, gonadotropin releasing hormone agonists, nonsteroidal anti-inflammatory drugs, trigger point injections, physical therapy, and psychotherapy in various combinations. Management of pain medications and trigger point injections was performed by our clinic physicians, while physical therapy and psychologically based therapies were conducted by certified therapists within our referral network. Surgical treatments ranged from minimally diagnostic laparoscopy to lysis of adhesions, excision or ablation of endometriosis, unilateral or bilateral oophrectomy, ovarian cystectomy, pain mapping, uterine suspension, uterosacral ablation, and hysterectomy. Laparotomy, vaginal, and vulvar surgery was also included in the surgical treatment group.

Statistical analysis

For the purposes of this study, patients were categorized into 2 exposure groups: medical or surgical treatment. Medical treatment patients may have had previous medical or surgical therapy before referral, but did not receive surgical therapy while at UNC. The surgical group included all women who had surgery at UNC, regardless of previous treatment. Patients who received both medical and surgical therapy at UNC were considered part of the surgical study group.

The main outcome of our analysis was improvement in pain 1 year after initial evaluation. Pain levels were grouped into the MPQ total score categories: no pain or minimal pain (MPQ score 0-15); mild pain (MPQ score 16-25); moderate pain (MPQ score 26-35); and severe pain (MPQ score ≥ 36). BDI depression scores at baseline and at 1 year were grouped as follows: no depression (0-9); mild or minimal (10-18); moderate (19-29); and severe depression (BDI score ≥ 30).

For description of long-term outcomes, change in pain level from baseline to follow-up was defined as: (1) worsened (if pain changed from no pain to mild, moderate, or severe, if pain changed from mild to moderate or severe, or if pain changed from moderate to severe); (2) no change (if the pain level category did not change from baseline to follow-up); (3) improved (if pain changed from severe to moderate, severe to mild, or moderate to mild); and (4) resolved (if pain changed from moderate, mild, or severe to no pain). Changes in depression levels were categorized in the same manner, ie, worsened, no change, improved, and resolved.

All data were converted from the SAS database to STATA for statistical analysis (STATA Corporation: STATA 8, College Station, TX). We employed univariate analysis to identify outliers, normal or non-normal distributions, data entry errors, missing data, and biologic plausibility of unusual values. Continuous variable distributions were tested for normality using the Shapiro-Wilk statistic. Continuous variables with skewed distributions were summarized using medians and ranges and categorical data were described using frequencies.

Bivariate analyses were performed to determine associations between participant characteristics and treatment group. The Wilcoxon rank sum test was used for non-normal continuous variables, Pearson's χ^2 was used for comparison of categorical variables, and Fisher exact test for comparison of categorical variables with low frequencies. The comparison of before and after pain levels used 1-sample paired t tests for within group analysis and 2-sample t tests for comparisons between 2 groups. Bivariate analyses were used to calculate odds ratios (OR) and 95% confidence intervals (95%CI) for the association between treatment group and improvement in pain and depression levels.

Multivariable analyses were performed to describe the association of having surgical treatment with improvement of pain. To identify potential effect modifiers we first conducted bivariate comparisons between all patient characteristics and the exposure, ie, having surgical treatment. Effect modifiers were considered if they had a Mantel-Haenszel test for homogeneity of $P < .1$. Next, we conducted bivariate analysis to identify any potential relationship between patient characteristics and improved post-treatment pain levels. Any patient characteristic that was associated ($P < .1$) with having surgical treatment or with having the outcome was evaluated in the final multivariable models as a possible confounder of the relationship between treatment group and improvement in pain. Confounders evaluated in final models included age, history of sexual abuse, history of physical abuse, current depression (moderate or severe), current sexual dysfunction, previous treatments tried (medical, surgical or both), number of pain sites, and duration of pain. We explored Poisson regression and GEE models where improvement in pain level was defined as a decrease in the 1-year MPQ score by 1 point, or 4 points, or 30% from baseline. Later we also generated unconditional logistic regression models using improvement in pain level as the dependent variable. We started with a full model of all variables identified as potential confounders of the surgical treatment-improved pain association and used backward elimination to remove 1 variable at a time. A 10% change in the point estimate and likelihood ratios was used to determine whether a confounder should be retained. Because our conclusions were generally the same for all models

Table I Characteristics of women evaluated for chronic pelvic pain that completed evaluation 1 year after medical or surgical treatment

Characteristic	All (n = 370)	% (95% CI)	Medical (n = 181)	% (95% CI)	Surgical (n = 189)	% (95% CI)	*P* value*
Mean age (y) (SD, Range, 95% CI)	33.3 (10.0, 14-70, 32.3-34.3)		34.8 (11.6, 15-70, 33.1-36.5)		31.9 (8.0, 14-59, 30.8-33.0)		.003
Race							.902
White	310	84 (80-87)	151	83 (77-89)	159	84 (78-89)	
Black	51	13 (10-18)	26	14 (10-20)	25	13 (9-19)	
Other	9	2 (1-5)	4	2 (1-6)	5	3 (1-6)	
Missing	0	0 (0-1)	0	0 (0-2)	0	0 (0-2)	
Marital status							.563
Single	89	24 (20-29)	46	25 (19-32)	43	23 (17-29)	
Married	213	58 (52-63)	99	55 (47-62)	114	60 (53-67)	
Separated/divorced	64	17 (14-22)	33	18 (13-25)	31	16 (11-23)	
Widowed	4	1 (0-3)	3	2 (0-5)	1	1 (0-3)	
Missing	0	0 (0-1)	0	0 (0-2)	0	0 (0-2)	
Annual income							.053
$<$ $20,000	121	33 (28-38)	59	34 (26-406)	62	35 (26-40)	
$20,001-$35,000	89	24 (20-29)	54	31 (23-37)	35	20 (13-25)	
$>$ $35,001	137	37 (32-42)	58	34 (25-39)	79	45 (35-49)	
Missing	23	6 (4-9)	2	1 (0-4)	0	0 (0-2)	
Education							.284
$\leq$9th grade	13	4 (2-6)	7	4 (2-8)	6	3 (1-7)	
10-12th grade	46	13 (9-16)	19	11 (6-16)	27	14 (10-20)	
High school graduate or GED	108	29 (25-34)	59	33 (26-40)	49	26 (20-33)	
College graduate	152	41 (36-46)	67	37 (30-44)	85	45 (38-52)	
Postgraduate	50	14 (10-18)	28	16 (11-22)	22	12 (7-17)	
Missing	1	0 (0-2)	1	1 (0-3)	0	0 (0-2)	
Mean duration of pain (y) (SD, Range, 95% CI)	4.6 (5.4, 0.1-34, 4.0-5.2)		4.9 (6.3, 0.1-34, 4.0-5.8)		4.4 (4.4, 0.1-20, 3.8-5.0)		.422
Duration of pain (y)							.650
$\leq$4	249	70 (62-72)	124	71 (61-75)	125	69 (59-73)	
$>$4	108	30 (25-34)	50	29 (21-35)	56	31 (23-37)	
Mean number of pain sites (SD, Range)	3.8 (1.9, 1-8, 3.6-4.0)		3.6 (1.8, 1-8, 3.4-3.9)		3.9 (1.9, 1-8, 3.6-4.2)		.155
Number of pain sites							.038
$\leq$4	244	67 (61-71)	128	72 (64-77)	116	62 (54-68)	
5+	122	33 (28-38)	50	28 (21-35)	72	38 (31-45)	
Had previous surgical treatment	345	93 (90-96)	163	90 (85-94)	182	96 (93-99)	.017
Sexual abuse, adult or child	133	36 (31-41)	68	38 (31-45)	65	34 (28-42)	.732
Physical abuse, adult	92	30 (21-30)	44	29 (18-31)	48	32 (19-32)	.618
Depression	82	22 (18-27)	40	22 (16-29)	42	22 (17-29)	.892
Sexual dysfunction	283	77 (72-81)	129	71 (64-78)	154	82 (75-87)	.021
Most common diagnosis							
IBS	135	37 (32-42)	68	38 (31-45)	67	36 (29-43)	.672
Adhesions	85	23 (19-28)	25	14 (9-20)	60	32 (25-39)	.000
Pelvic floor tension	84	23 (19-27)	51	28 (22-35)	33	18 (12-24)	.014
Myofascial pain-vaginal	58	16 (12-20)	33	18 (13-25)	25	13 (9-19)	.193
Endometriosis	57	16 (12-20)	20	11 (7-17)	37	20 (14-26)	.022
Pyriformis pain	50	14 (10-17)	29	16 (11-22)	21	11 (7-17)	.173
Vestibulitis	26	7 (5-10)	16	9 (5-14)	10	5 (3-10)	.186
Vaginismus	17	5 (3-7)	10	6 (3-10)	7	4 (2-8)	.355

GED, General equivalency diploma.

* *P* values represent comparisons between the medical and surgical groups.

Table I (*Continued*)

Characteristic	All (n = 370)	% (95% CI)	Medical (n = 181)	% (95% CI)	Surgical (n = 189)	% (95% CI)	*P* value*
Pelvic congestion	12	3 (2-6)	7	4 (2-8)	5	3 (1-6)	.513
Adenomyosis	7	2 (1-4)	5	3 (1-6)	2	1 (0-4)	.232
Fibroids	6	2 (1-4)	4	2 (1-6)	2	1 (0-4)	.384
Pelvic relaxation	6	2 (1-4)	3	2 (0-5)	3	2 (0-5)	.963
Urethral syndrome	6	2 (1-4)	2	1 (0-4)	4	2 (1-5)	.441
Low back pain	5	1 (0-3)	4	2 (1-6)	1	1 (0-3)	.163
Nerve entrapment	1	0 (0-2)	1	1 (0-3)	0	0 (0-2)	.307

GED, General equivalency diploma.
* *P* values represent comparisons between the medical and surgical groups.

explored, the results presented here are based on a final multivariable regression model where the pain outcome was a bivariate variable that categorized all patients pain levels into improved (if the pain resolved or improved) or not improved (if the pain worsened or remained unchanged).

Results

Of the 987 women seen in our CPP clinic between 1993 and 2000, records were successfully abstracted in 970 (98%) cases. The data presented here are obtained from 370 (38%) women whose records were complete and who returned the questionnaires at 1 year. Baseline characteristics of questionnaire respondents (n = 370) and nonrespondents (n = 600), were statistically similar in age, racial distribution, marital status, annual income, education, duration of pain, number of pain sites, history of child or adult sexual abuse, history of adult physical abuse, depression, sexual dysfunction, and previous treatments (including number of previous surgeries).

In the 370 women who were evaluated at baseline and 1 year, mean age was 33 years (range 14-70), 84% were Caucasian, 24% had never been married, 33% had an annual income less than $20,000, and 45% had less than a high-school degree (Table I).

For the entire study cohort, the mean baseline MPQ score was 30.4 (SD 14.7, range 3-84). Thirty percent of patients had pain for 4 years or more, 33% had at least 5 painful sites, and 93% had previous surgery for their pain before referral to the UNC CPP clinic. Seventy-six percent of women reported sexual dysfunction, defined as painful intercourse, decreased frequency, or decreased pleasure resulting from pain.

Twenty-two percent of women had moderate or severe depression defined by the BDI. Of the women we could assess for abuse, 36% had a history of adult or child sexual abuse and 30% had a history of adult physical abuse. Only depression ($P < .0001$) and adult sexual abuse ($P < .0001$) were associated with higher MPQ scores at baseline.

After evaluation in the CPP clinic, the most common diagnosis made included: irritable bowel syndrome, adhesions, pelvic floor musculoskeletal disorders, and endometriosis (Table I). For all conditions found, 49% (n = 181) of the patients received medical treatment (pharmacotherapy, physical therapy, cognitive-behavioral therapy, or combinations of the 3) and 51% (n = 189) received surgical treatment (54 hysterectomies and 135 other procedures without hysterectomy, eg, diagnostic laparoscopy, adhesiolysis, resection of endometriosis, oophrectomy). After 1 year, the mean MPQ score for the entire cohort decreased from 30.4 to 23.3 (SD 17.3, range 0-75), $P < .0001$.

The medical and surgical treatment groups were comparable in marital status, income, and education (Table I). However, women in the medical group were older than those in the surgical group (38.4 yrs vs. 31.9 yrs, $P = .003$). Dyspareunia, adhesions, endometriosis, and pelvic floor tension were more commonly diagnosed during clinical evaluation in those who had surgery at UNC (Table I).

At baseline, pain intensity and duration was similar in both groups (Table I). However, the surgical group had a higher frequency of women with 5 or more pain sites (38% vs 28%, $P = .038$) when compared with the medical group (Table I). The prevalence of sexual abuse, physical abuse, depression, and sexual dysfunction was similar in both groups. At 1 year, for 48% of patients (medical and surgical groups) the severity of depression did not change, and in 21% the depression worsened (Table II). For 31% the depression improved or resolved predominately in those with mild depression at initial evaluation (Table II).

McGill pain scores were significantly lower after 1 year of treatment within each treatment group (medical group $P < .000$ and surgical group $P < .000$), but improvement was similar in both groups ($P = .165$). Pain levels were moderate or severe in 49% of patients in both the medical and surgical groups at baseline and decreased to less than 34% in both groups after 1 year (Table III). Nineteen percent of the medical group and 16% of the surgical group reported worsening pain

Table II Changes in pain and depression at 12 months by treatment group

	All		Medical		Surgical		
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	OR* (95% CI)
% Change in pain							
Worsened	65	18 (14-22)	34	19 (13-25)	31	16 (11-23)	0.9 (0.5-1.5)
No change	136	37 (32-42)	65	36 (29-43)	71	38 (31-45)	1.1 (0.7-1.7)
Improved	45	12 (9-16)	24	13 (9-19)	21	11 (7-17)	0.8 (0.4-1.6)
Resolved	124	34 (29-39)	58	32 (25-39)	66	35 (28-42)	0.9 (0.5-1.5)
% Change in depression†							
Worsened	73	21 (16-25)	37	21 (15-27)	36	20 (14-25)	0.9 (0.5-1.6)
No change	171	48 (43-53)	85	48 (40-55)	86	48 (38-53)	0.9 (0.6-1.5)
Improved	26	7 (5-11)	11	6 (3-11)	15	8 (5-13)	1.3 (0.6-3.3)
Resolved	86	24 (20-29)	44	25 (18-31)	42	24 (17-29)	0.9 (0.5-1.5)

* Unadjusted odds of worsening, no change, improvement or resolution of pain when receiving medical treatment compared to surgical treatment. Adjusted odds and results of multivariable models are presented in the text.

† The depression category had 4 patients missing follow-up depression scores in the medical group and 10 missing scores in the surgical group.

Table III Participant description of pain and depression levels at baseline and at 12 months by treatment group

	All				Medical				Surgical			
	Baseline		12 months		Baseline		12 months		Baseline		12 months	
	(n = 370)	% (95% CI)	(n = 370)	% (95% CI)	(n = 181)	% (95% CI)	(n = 181)	% (95% CI)	(n = 189)	% (95% CI)	(n = 189)	% (95% CI)
% Pain*												
No/minimal pain	86	23 (19-28)	175	47 (42-53)	39	22 (16-28)	77	43 (35-50)	47	25 (19-32)	98	52 (45-59)
Mild	104	28 (24-33)	71	19 (15-24)	54	30 (23-37)	38	21 (15-28)	50	27 (20-33)	33	18 (12-24)
Moderate	37	10 (7-14)	26	7 (5-10)	18	10 (6-15)	13	7 (4-12)	19	10 (6-15)	13	7 (4-12)
Severe/very severe	143	39 (34-44)	98	27 (22-31)	70	39 (32-47)	53	29 (23-37)	73	39 (32-46)	45	24 (18-31)
Missing	0	0 (0-14)	0	0 (0-1)	0	0 (0-2)	0	0 (0-2)	0	0 (0-2)	0	0 (0-2)
% Depression†												
No depression	124	34 (29-39)	187	51 (45-56)	57	32 (25-39)	89	49 (42-57)	67	37 (29-43)	98	52 (45-59)
Mild	152	41 (36-46)	98	27 (22-31)	80	45 (37-52)	50	28 (21-35)	72	40 (31-45)	48	26 (19-32)
Moderate	57	15 (12-20)	61	17 (13-21)	29	16 (11-22)	32	18 (12-24)	28	16 (10-21)	29	16 (11-21)
Severe/very severe	25	7 (4-10)	22	6 (4-9)	11	6 (3-11)	10	6 (3-10)	14	8 (4-12)	12	6 (3-11)
Missing	12	3 (2-6)	2	1 (0.1-2)	4	2 (1-6)	0	0 (0-2)	8	4 (2-8)	2	1 (0-4)

Values are presented as n, % (95% CI) unless otherwise noted.

* Pain is defined using the McGill Pain Questionnaire score: 0-15 no pain/minimal pain, 16-25 mild pain, 26-30 moderate, 31-35 severe, 36+ very severe.

† Depression is defined using the Beck Depression Inventory: 0-9 no depression, 10-18 minimal depression, 19-29 moderate depression, 30+ severe depression.

(Table II). Measured by MPQ score, the odds of improvement in pain (decrease of 1 point or more from baseline) for women having surgical treatment is similar to those having medical treatments (OR 1.2; 95% CI 0.8-1.6).

Multivariable analyses of the association between surgical treatment and pain improvement showed that women who received medical treatment were just as likely to improve as those receiving surgical treatment (OR 0.9, 95% CI 0.0.6-1.3). This finding persisted even after we adjusted for age, sexual abuse, physical abuse, depression, number of pain sites, pain duration, hormonal status, and previous treatments. We found no effect modifiers or significant interaction between depression and abuse. Although in bivariate analysis moderate or severe depression was associated with higher levels of pain at baseline, the severity of depression did not influence pain outcomes.

Comment

Chronic pelvic pain is a complex disorder that often requires use of several treatment modalities. Although chronic pain centers and the "multidisciplinary"

treatment approach is recommended by pain experts,[7] little is published about long-term outcomes of women managed in tertiary settings.

Following evaluation at our institution, treatments recommended by physicians were evenly distributed between primarily medical treatments (49%) and surgical treatments (51%). At the 1-year follow-up, approximately 46% of patients experienced improvement or resolution of pain (45% in the medical group and 46% in the surgical group); in 37% the pain did not change and in 18% the pain worsened.

Similar to other published reports,[13] the most frequent disorders associated with CPP were nongynecologic (37% irritable bowel syndrome and more than 23% musculoskeletal disorders). Endometriosis was the source of pain in only 15% of women, making it the leading gynecologic disorder associated with CPP in our population. Although nongynecologic disorders were more often the cause of pain, at least 90% of women had had some type of unsuccessful gynecologic surgery for their pain before evaluation in our clinic, suggesting that, in women with CPP, an evaluation for nongynecologic sources of pain is often important before undertaking gynecologic surgery.

Several earlier studies describe a high rate of psychiatric diagnoses, abuse, and sexual trauma in patients with chronic pelvic pain.[6,14-16] Our study confirms these findings: depression (22% moderate or severe, 41% mild), sexual dysfunction (77%), history of sexual abuse (36%) and physical abuse (30%) were prevalent in our population. At baseline, moderate or severe depression was associated with higher pain intensity. BDI scores 1 year later showed that rates of mild depression often improved, moderate or sever depression was unchanged. However, the presence of moderate or severe depression or history of abuse was not associated with lower likelihood for pain improvement (with either medical or surgical therapy). These findings suggest that although psychosocial variables may be important for the clinician to understand, we lack sufficient evidence to support that their presence should influence the outcome of otherwise indicated medical or surgical therapy.

Our large sample size and prospectively collected quantifiable data provided the unique ability to look at long-term outcomes in a tertiary care setting. The extent of the data collected gave us the opportunity to analyze pain levels while taking into account multiple other variables ranging from comorbidities, specific descriptors of pain intensity, sexual function, diagnoses, and treatments. Although we found that patients had various gynecologic and nongynecologic diagnoses, our ability to clinically diagnose interstitial cystitis (IC) was limited. More recent reports show that as many as 24% to 80% of women with pelvic pain have urinary symptoms consistent with IC.[13,17] Thus, it is likely that our study sample includes a significant percentage of women with this condition. It is important to note that outcomes were measured only at 12 months; thus, we cannot comment on speed of recovery or short-term outcomes. In this time period, we were also limited by our inability to ensure compliance with recommended treatment and by our study design, which does not permit us to establish a direct causal link between specific treatments and improvement in pain.

This prospective cohort shows that in even in this highly specialized "multidisciplinary" setting, improvement in pain levels 1 year after evaluation was modest. That medical and surgical therapies are equally effective in treating pain is not unexpected. Equal long-term outcomes of surgical and nonsurgical management has been confirmed in other chronic pain disorders, such as low back pain.[18,19]

Only 46% of our cohort had improvement or resolution of pain and in spite of the many patient characteristics we identified, we were surprised to find that diagnosis, previous treatments received, duration of pain, and depression did not influence improvement in pain levels in either treatment group. Other factors not measured in this study such as: (1) patient-physician interaction; (2) patient-physician agreement regarding diagnosis and treatment[20]; and (3) patient's treatment expectation across other domains of concern in addition to pain, eg, physical functioning, may play an important role in treatment of pain.[20,21] In research of various pain disorders, desire for pain relief, expectation, and frequent interaction with an empathetic health care provider are thought to modulate pain relief partially through a placebo analgesic effect and partially by affecting brain mechanisms that influence pain levels, hyperalgesia, and response to analgesics.[22-28] Additional research will be needed to determine whether patient expectations and patient-provider interaction are also important in the treatment of CPP.

For the authors and other chronic pain experts, the question remains whether it is possible to prospectively identify which patients respond preferentially to specific treatments.[29] That is, can we develop evidence-based screening tools, reproducible criteria for clinical exam findings, and prediction rules to help identify subgroups of patients with CPP most likely to benefit from particular therapies? Operational definitions of subtypes of pelvic pain may add to our understanding of the pathophysiology and heterogeneity of CPP and allow better structured randomized trials of specific therapies.

References

1. Mathias SD, Kuppermann M, Liberman RF, Lipschutz RC, Steege JF. Chronic pelvic pain: prevalence, health-related quality of life, and economic correlates. Obstet Gynecol 1996;87:321-7.
2. Howard FM. The role of laparoscopy in chronic pelvic pain: promise and pitfalls. Obstet Gynecol Surv 1993;48:357-87.

3. Howard FM. Chronic pelvic pain in women. Am J Manag Care 2001;7:1001-11; quiz 1012-3.
4. Steege JF. Assessment and treatment of chronic pelvic pain. Telinde Operative Gynecol Updates 1992;1:1-10.
5. Steege JF, Stout AL. Resolution of chronic pelvic pain after laparoscopic lysis of adhesions. Am J Obstet Gynecol 1991;165:278-81; discussion 281-3.
6. Reiter RC, Gambone JC. Demographic and historic variables in women with idiopathic chronic pelvic pain. Obstet Gynecol 1990; 75:428-32.
7. Steege JF, Metzger DA, Levy BS. Chronic pelvic pain: an integrated approach. Philadelphia: WB Saunders Company; 1998.
8. Howard FM. Chronic pelvic pain. Obstet Gynecol 2003;101: 594-611.
9. Williams RE, Hartmann KE, Sandler RS, Miller WC, Steege JF. Prevalence and characteristics of irritable bowel syndrome among women with chronic pelvic pain. Obstet Gynecol 2004;104:452-8.
10. Williams RE, Hartmann KE, Sandler RS, Miller WC, Savitz LA, Steege JF. Recognition and treatment of irritable bowel syndrome among women with chronic pelvic pain. Am J Obstet Gynecol 2005;192:761-7.
11. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiatry 1961;4:561-71.
12. Melzack R. The McGill Pain Questionnaire: major properties and scoring methods. Pain 1975;1:277-99.
13. Zondervan KT, Yudkin PL, Vessey MP, Jenkinson CP, Dawes MG, Barlow DH, et al. Chronic pelvic pain in the community–-symptoms, investigations, and diagnoses. Am J Obstet Gynecol 2001;184:1149-55.
14. Harrop-Griffiths J, Katon W, Walker E, Holm L, Russo J, Hickok L. The association between chronic pelvic pain, psychiatric diagnoses, and childhood sexual abuse. Obstet Gynecol 1988;71: 589-94.
15. Magni G, Andreoli C, de Leo D, Martinotti G, Rossi C. Psychological profile of women with chronic pelvic pain. Arch Gynecol 1986;237:165-8.
16. Walling MK, O'Hara MW, Reiter RC, Milburn AK, Lilly G, Vincent SD. Abuse history and chronic pain in women: II. A multivariate analysis of abuse and psychological morbidity. Obstet Gynecol 1994;84:200-6.
17. Stanford EJ, Koziol J, Feng A. The prevalence of interstitial cystitis, endometriosis, adhesions, and vulvar pain in women with chronic pelvic pain. J Minim Invasive Gynecol 2005;12:43-9.
18. Atlas SJ, Keller RB, Wu YA, Deyo RA, Singer DE. Long-term outcomes of surgical and nonsurgical management of sciatica secondary to a lumbar disc herniation: 10 year results from the maine lumbar spine study. Spine 2005;30:927-35.
19. Atlas SJ, Keller RB, Wu YA, Deyo RA, Singer DE. Long-term outcomes of surgical and nonsurgical management of lumbar spinal stenosis: 8 to 10 year results from the maine lumbar spine study. Spine 2005;30:936-43.
20. Gallagher RM. Do patient expectations and diagnostic specificity affect outcomes in pharmacological trials in pain medicine. Pain Med 2005;6:331-3.
21. Robinson ME, Brown JL, George SZ, Edwards PS, Atchison JW, Hirsh AT, et al. Multidimensional success criteria and expectations for treatment of chronic pain: the patient perspective. Pain Med 2005;6:336-45.
22. Birklein F, Rowbotham MC. Does pain change the brain? Neurology 2005;65:666-7.
23. Levine JD, Gordon NC, Fields HL. The mechanism of placebo analgesia. Lancet 1978;2:654-7.
24. Gryll SL, Katahn M. Situational factors contributing to the placebo effect. Psychopharmacology 1978;57:253-61.
25. Vase L, Robinson ME, Verne GN, Price DD. The contributions of suggestion, desire, and expectation to placebo effects in irritable bowel syndrome patients. An empirical investigation. Pain 2003;105:17-25.
26. Vase L, Robinson ME, Verne GN, Price DD. Increased placebo analgesia over time in irritable bowel syndrome (IBS) patients is associated with desire and expectation but not endogenous opioid mechanisms. Pain 2005;115:338-47.
27. Amanzio M, Pollo A, Maggi G, Benedetti F. Response variability to analgesics: a role for non-specific activation of endogenous opioids. Pain 2001;90:205-15.
28. Fields HL. Pain modulation: expectation, opioid analgesia and virtual pain. Prog Brain Res 2000;122:245-53.
29. Shekelle PG, Delitto AM. Treating low back pain. Lancet 2005; 365:1987-9.

Discussion

Dianna L. Curtis, MD. Dr Gallup, Dr Anderson, members and guests of the South Atlantic, I appreciate and thank you for the opportunity to discuss the paper of Dr Georgine Lamvu entitled "Long-term outcomes after surgical and nonsurgical management of chronic pelvic pain: One year after evaluation in a pelvic pain specialty clinic."

I commend Dr Lamvu and her coworkers for their extensive work investigating the complex relationships involving treatment of chronic pelvic pain, a condition that has continued to elude simple and definitive answers for so many of us.

This 7-year study of chronic pelvic pain patient outcomes compares medical and surgical treatment. In reviewing the abundance of literature regarding chronic pelvic pain and treatment, I was unable to locate a study with a comparable sample size of patients that took into account the numerous confounding variables affecting these patients such as dyspareunia, sexual and physical abuse history, and socioeconomic status. I applaud the authors for their use of well-developed testing tools and questionnaires that helped provide objectivity in reporting and evaluating patient responses. Clearly, this impacts the power of the statistical interpretation of their findings in a positive light.

In November 2000, Dr Fred Howard reviewed 6 randomized controlled trials evaluating treatment of endometriosis-associated chronic pelvic pain,[1] a small subpopulation of patients, in comparison to this study. The findings of a decrease in pain scores at 6 months was similar in both medical and surgical treatment groups and support those of Dr Lamvu and associates' larger more diverse patient population. Studies such as these support the current teachings in residency training programs that one should exhaust all medical treatment options before considering surgical evaluation and/or treatment. In the November 2002 issue of *Fertility and Sterility*, a consensus statement was published by 50 expert panelists of practicing gynecologists providing clinical recommendations and algorithms for treatment of chronic pelvic pain and endometriosis,[2] which outlined a plan for medical management before pursuing surgery, unless there is a suspicious pelvic mass.