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Determinants of Therapeutic Success: Patient and Procedural Factors in Injection-Based Treatment of Myofascial Pelvic Pain

Short Communication

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Abstract

Despite recent expert consensus guidelines for managing myofascial pelvic pain (MPP), the evidence supporting second-line treatments remains insufficient for patients who fail conservative measures. Our objective was to identify patient characteristics and injection techniques associated with treatment success for trigger point injections (TPI) and botulinum toxin injections (BTX-A) in patients with MPP. This retrospective chart review included adult women with MPP who received TPI (n=66) or BTX-A injections (n=17) at an academic clinic from January 2021 to December 2023.

Treatment "success" was defined as symptom resolution or continued treatment maintenance; treatment "failure" was defined as progression to alternative therapies due to inadequate symptom improvement or patient-reported lack of benefit. Variables examined included demographics, presence of chronic overlapping pain conditions (COPCs), comorbid pelvic floor symptoms (lower urinary tract, bowel or sexual dysfunction symptoms), and injection techniques. Statistical comparisons by treatment outcome utilized t-tests to compare continuous variables and Pearson's chi-square or Fisher's exact test to compare the distribution of categorical variables. Rates of treatment success were 83% of TPI patients (55/66) versus 53% of BTX-A patients (9/17).

No significant associations were identified between TPI success and demographics, individual or cumulative COPCs, comorbid pelvic floor symptoms, or injection techniques. For BTX-A injections, eight patients had previously failed TPI. Patients experiencing BTX-A success were older (mean age 56.3 years vs. 40.1 years, (p=0.03) and had higher Charlson comorbidity indices (median 3.0 vs. 0.5, p=0.024).

No other demographic, clinical, or technical factors were associated with BTX-A treatment success (Table 2). In conclusion, both TPIs and BTX-A injections demonstrated favorable outcomes. While no patient or technical factors predicted TPI success, BTX-A outcomes were significantly associated with patient age and comorbidity burden. These findings suggest that patient selection criteria may be more relevant for BTX-A than TPI when treating MPP.

Keywords: trigger point injection, botulinum toxin injection, myofascial pelvic pain, chronic overlapping pain conditions, chronic pelvic pain, high-tone pelvic floor dysfunction, injection techniques, pelvic floor injections, lower urinary tract symptoms, chemodenervation

Abbreviations: (TPI): trigger point injection; (BTX-A): botulinum toxin A; (MPP): myofascial pelvic pain; (ICD): International Statistical Classification of Diseases; (CPT): Current Procedural Terminology; (COPCs): (chronic overlapping pain conditions); (IRB): Institutional Review Board; (BMI): body mass index; (LUTS): lower urinary tract symptoms; (CCI): Charlson Comorbidity index.

Introduction

Chronic pelvic pain affects between 5.7% to 26.6% of women, with myofascial pelvic pain (MPP) comprising 14-23% of cases [1,2]. The

complex interaction between regional pain and central sensitization makes MPP challenging to treat, often necessitating a multimodal approach (Ob & Gyn 2020).

Recent consensus-based clinical practice guidelines recommend pelvic floor physical therapy and home therapies as first-line therapy for MPP. Second-line options include trigger point injections (TPIs) and vaginal muscle relaxants, while botulinum toxin A (BTX-A) is considered a second or third-line option. [3] Although both TPIs and BTX-A injections have demonstrated reductions in pelvic pain scores, existing studies are limited by small sample size and significant heterogeneity in technique and dosage [4]. Given that pelvic floor injections can be painful, costly, and carry procedural risks, identifying predictors of treatment success is essential for patient counseling and shared decision-making.

This study aims to describe patient and technical factors associated with TPI or BTX-A injection success to inform pre-procedural counseling and treatment selection.

Materials And Methods

This descriptive study was conducted at an academic Minimally Invasive Gynecologic Surgery clinic with IRB exemption (IRB#***). Adult biological females diagnosed with MPP who received pelvic floor TPIs or BTX-A injections between January 2021 and December 2023 were identified using ICD-9, ICD-10, and CPT codes (Table 1).

Treatment "success" was defined as symptom resolution or continued treatment maintenance while treatment "failure" was defined as progression to alternative therapies due to inadequate symptom improvement or documented patient-reported lack of benefit. Manual chart review of the electronic medical record was performed by four reviewers (LT, RB, TV, TS). Patients were identified as recipients of TPIs, BTX-A injections, or both. Patients receiving only non-pelvic floor injections (e.g., isolated abdominal wall TPIs) were excluded. Charts with indeterminate outcomes were reviewed by the primary author for confirmation before exclusion.

Variables potentially associated with treatment success included demographic data, presence of chronic overlapping pain conditions (COPCs)--endometriosis, vulvodynia, fibromyalgia, interstitial cystitis/bladder pain syndrome, irritable bowel syndrome, chronic low back pain, tension-type headache or migraine headache, myalgic encephalitis/chronic fatigue syndrome or temporomandibular joint disorder-- comorbid pelvic floor symptoms (lower urinary tract, bowel or sexual dysfunction symptoms), and injection techniques (location, medication, dosage, timing). Data was collected using REDCap software [REDCap Consortium, Nashville, TN, USA [5,6].

Univariate and bivariable statistics were performed to describe the sample and to explore potential differences between those who had treatment success compared to those who did not. Only participants for whom treatment "success" or "failure" could be determined were included in analysis. Continuous variables (age, Charlson comorbidity index score, and BMI) were compared among treatment successes and treatment failures using t-tests stratified by treatment (TPI or BTX-A). The distribution of categorical variables (race, ethnicity, employment status, insurance status, presence or absence of comorbid conditions, parity, alcohol use, and medication use as well as injection specific information related to location of injection and dosing) for both treatments was compared by success of failure using Pearson's chi-square or Fisher's exact test (for comparisons with sparse data). All statistical analysis was performed using Stata software (v19 College Station, TX) [7].

Results

Of 128 patients initially identified, 39 were excluded for receiving only abdominal wall trigger point injections. The final cohort included 66 patients who received pelvic floor TPIs (13 were excluded due to indeterminate outcomes) and 17 who received BTX-A injections (2 were excluded due to indeterminate outcomes).

Trigger Point Injections

The TPI cohort had a mean age of 44 years (SD=15) and BMI of 30 kg/m2 (SD=6.4). Most patients identified as white (64%) or black (23%), and (7.6%) were Hispanic (Table 2). TPIs predominately targeted the levator ani muscles (n=54, 82%), with fewer administered to the superficial transverse perineal muscles (n=7,11%). Concomitant pudendal blocks were performed in 14 patients (21.2%). The mean volume of 0.25% bupivacaine used was 10.2 ml (SD 3.9). Triamcinolone was added to injections of 45 patients (68%).

Fifty-five of the 66 patients (83%) achieved treatment success. No significant differences were observed between success and failure groups in demographics, history of transvaginal mesh placement, prevalence of COPCs (82% in both groups), concomitant pain medication use, associated pelvic floor symptoms including lower urinary tract symptoms (LUTS), bowel symptoms, or sexual dysfunction (Table 2).

Botulinum Toxin An Injections

The BTX-A cohort had a mean age of 49 years (SD=16) and BMI of 30 m/kg2 (SD=7.3). All patients were white and Non-Hispanic. Eight patients (47%) had previously failed TPI therapy (Table 3). BTX-A was predominately administered as 100 units (n=11, 64%), given bilaterally (n=13, 77%), primarily targeting the levator ani (n=16, 94%). Nine of 17 patients (53%) achieved treatment success. The BTX-A success group was significantly older than the failure group (mean 56 versus 40 years, p=0.029) and had higher mean Charlson Comorbidity Index scores (CCI) (3 versus 0.5, p=0.024). No other significant differences were observed by treatment outcome when compared by demographics, history of vaginal mesh placement, prevalence of COPCs, concomitant pain medication use or associated pelvic floor symptoms (Table 3).

Table 1: Diagnosis and procedural codes used for medical record search.

ICD 9/10	CPT
A) Pelvic floor tension; 597.81; M62.89	A) 20552 – Injection(s); single or multiple trigger point(s); 1 or 2 muscles
B) High-tone pelvic floor dysfunction; 629.89; N94.89	B) 20553 – Single or multiple trigger point(s); 3 or more muscles
C) High-tone pelvic floor dysfunction in female; 629.89; M62.89	C) 64646 – Chemodenervation of trunk muscle(s); 1–5 muscle(s)
D) Myalgia of pelvic floor; 729.1; M79.18	D) 64647 – Chemodenervation of trunk muscle(s); 6 or more muscle(s)
E) Myofascial pain; 729.1; M79.18	
F) Chronic myofascial pain; 729.1, 338.29; M79.18, G89.29	

Table 2: Results from the trigger point injection cohort.

	Total	"Success" group	"Failure" group	Test*
N	66 (100.0%)	55 (83.3%)	11 (16.7%)	
Demographic data				
Age (years), mean (SD)	44.4 (14.7)	44.5 (14.7)	43.8 (15.4)	0.89
BMI, mean (SD)	29.8 (6.37)	29.7 (5.9)	29.6 (8.5)	0.94
Charlson comorbidity index, median (min, max)	1.1 (1.4)	1.1 (1.5)	0.9 (0.8)	0.69
Race				
White	42 (63.6%)	34 (61.8%)	8 (72.7%)	0.6
Black	15 (22.7%)	13 (23.6%)	2 (18.2%)	
Hispanic or non-Hispanic				
Non-Hispanic	61 (92.4%)	50 (90.9%)	11 (100.0%)	0.58
Hispanic	5 (7.6%)	5 (9.1%)	0 (0.0%)	
Insurance				
Private	55 (91.7%)	47 (92.2%)	8 (88.9%)	0.57
Public	5 (8.3%)	4 (7.8%)	1 (11.1%)	
Any Chronic Overlapping Pain Condition	54 (81.8%)	45 (81.8%)	9 (81.8%)	1
History of csection	13 (19.7%)	10 (18.2%)	3 (27.3%)	0.49
History of pelvic mesh placement				
Sling	2 (3.1%)	2 (3.6%)	0 (0.0%)	0.76
Vaginal mesh for prolapse	1 (1.5%)	1 (1.8%)	0 (0.0%)	
No	58 (87.9%)	49 (89.1%)	9 (81.8%)	
Parity:				
0	21 (31.8%)	18 (32.7%)	3 (27.3%)	0.59
1	10 (15.2%)	7 (12.7%)	3 (27.3%)	
2	16 (24.2%)	13 (23.6%)	3 (27.3%)	
3 and higher	19 (28.8%)	17 (30.9%)	2 (18.2%)	
Concomitant medications				
NSAID	20 (30.3%)	16 (29.1%)	4 (36.4%)	0.72
Neuropathic	25 (37.9%)	18 (32.7%)	7 (63.6%)	0.09
SNRI	10 (15.2%)	7 (12.7%)	3 (27.3%)	0.35
Naltrexone	1 (1.5%)	1 (1.8%)	0 (0.0%)	1
Vaginal benzodiazepine	12 (18.2%)	10 (18.2%)	2 (18.2%)	1
Oral benzodiazepine	6 (9.1%)	3 (5.5%)	3 (27.3%)	0.05
Opioid	12 (18.2%)	12 (21.8%)	0 (0.0%)	0.19
Muscle relaxant	17 (25.8%)	14 (25.5%)	3 (27.3%)	1
Associated pelvic floor symptoms				
Lower urinary tract symptoms	27 (40.9%)	22 (40.0%)	5 (45.5%)	1
Bowel symptoms	22 (33.3%)	17 (30.9%)	5 (45.5%)	0.49
Sexual dysfunction	37 (56.1%)	30 (54.5%)	7 (63.6%)	0.73

Discussion

This retrospective study evaluated patient and technical factors associated with treatment success for pelvic floor trigger point and botulinum toxin A injections in myofascial pelvic pain. Both modalities demonstrated clinical utility, with 83% of TPI recipients and 53% of BTX-A recipients achieving treatment success. Our reported TPI success rate of 83% is consistent with previous studies, including a retrospective study of patients who initiated trigger point injections with local anesthetic and with or without a steroid which reported that 77% of patients had improved symptoms after a single injection [8]. A randomized double-blind study comparing patients who received ropivacaine plus triamcinolone to ropivacaine plus BTX-A found no difference in median pain scores between the two groups at one-month post-injection and no difference in whether patients would recommend the injections to a friend [9]. The notably higher success rate with TPIs, coupled with the observation that nearly half of the BTX-A cohort had failed prior TPI therapy, supports current consensus guidelines recommending TPIs as an earlier intervention in the treatment algorithm [4]. There was a lack of identifiable variables associated with TPI success across all examined variables in our study, including demographics, chronic overlapping pain conditions, comorbid pelvic floor symptoms, and injection techniques. This suggests that TPIs may benefit a broad range of patients with MPP and should not be withheld based on patient characteristics or clinical complexity.

The finding that BTX-A treatment success was associated with older age and higher Charlson Comorbidity Index is unexpected and potentially clinically significant. While a systematic review of the available literature found a significant decrease in pain scores after BTX-A injection when compared to placebo [10], to our knowledge there are no studies that look at patient factors associated with BTX-A success. The difference in treatment response by age is consistent with studies that have shown differences in the pain response of older versus younger adults, with greater release of inflammatory cytokines in the older cohort [11-13].

One might hypothesize that medically complex patients would be less likely to respond to treatment, however our data found the opposite, suggesting that medically complex patients might have differences in pain physiology than otherwise healthy patients. Alternatively, it may indicate that BTX-A's longer duration of action is particularly valuable in patients with limited treatment options due to medical complexity.

Important limitations include the observational design, relatively small sample size (particularly for BTX-A with only 17 patients), single-center setting (while in the same clinic, injections were performed by different providers), and lack of standardized outcome measures beyond treatment continuation versus escalation. Additionally, age and Charlson Comorbidity Index may represent confounding rather than predictive variables for BTX-A success. Insurance coverage for botulinum toxin-A (BTX-A) in pelvic floor disorders has historically been inconsistent and often requires documented failure of prior treatments before approval is granted (LCD Medicare, CPB Aetna, United MBDP).

Notably, federal government health insurance programs such as Medicare previously provided coverage in our clinics for this indication, which may have enabled older patients to pursue and continue BTX-A treatment over time -- potentially contributing to their overrepresentation among longer-term treatment success cases in this cohort. However, coverage has since been discontinued across both public and private insurers, leaving patients without a reliable reimbursement pathway regardless of payer type. This insurance-related barrier may have preferentially led younger patients to discontinue BTX-A treatment for financial rather than clinical reasons, thereby confounding the apparent association between older age, higher comorbidity burden, and treatment success [14-17].

The subjective definition of treatment success, while clinically relevant, may not fully capture nuances in symptom improvement or patient satisfaction across the heterogeneous population treated. Despite these limitations, this study provides clinically actionable insights for counseling patients regarding expected outcomes with pelvic floor injections.

Conclusion

While TPIs and BTX-A injections were both effective in the majority of treated patients with myofascial pelvic pain, more patients in the TPI cohort achieved treatment success. There were no patient or technical factors that predicted TPI success, while BTX-A success was significantly associated with patient age and comorbidity burden. Future prospective trials with standardized protocols, validated pain outcomes, longer follow-up periods, and more diverse patient populations are needed to confirm these findings and establish evidence-based treatment algorithms for myofascial pelvic pain refractory to conservative management.

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