

Comparing virtual and in-person training for intracavernosal injection therapy in a multidisciplinary sexual health clinic within a prostate cancer survivorship program

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ABSTRACT

INTRODUCTION: The Sexual Health Clinic (SHC) offered by the Prostate Cancer Supportive Care (PCSC) Program delivers sexual health therapies for prostate cancer (PCa) patients and their partners. Since April 2020, training for using intracavernosal injections (ICI) to treat erectile dysfunction (ED) has been offered either in-person or by virtual appointments. This study's primary objective was to assess the effectiveness of virtual compared to in-person ICI training by analyzing clinical and patient-reported outcomes (PROs) within each group.

METHODS: This is a retrospective, ethics-approved chart review of all patients who received ICI training between January 2019 and April 2023. PROs collected were obtained prospectively during routine clinical care. Outcomes, including PROs, satisfaction, and adverse events, were measured using surveys and validated questionnaires.

RESULTS: Over four years, 74 patients received ICI training, 54 virtually and 24 in-person. Each group's demographics are similar with respect to age, education level, ethnicity, and partner information. Most patients had not attempted ICI before enrolling in the SHC and were not satisfied with other therapeutic options to treat their ED. Adherence was high in both groups. Virtual and in-person ICI teaching was similar with respect to clinical outcomes and satisfaction. Overall satisfaction was low in both groups. The frequency of adverse events was comparable.

CONCLUSIONS: Overall, clinical outcomes with ICI training in the virtual format do not appear to differ from those completed in person. Larger, prospective studies are needed to confirm these results.

INTRODUCTION

Prostate cancer (PCa) is the most prevalent malignancy affecting Canadian men, with 28 761 new cases projected for 2025.¹ While often effective, the treatments for PCa are accompanied by a range of side effects, including the impairment of erectile function and sexuality.² These side effects are long-lasting and distressing to patients and their partners.³ Furthermore, impaired sexuality is closely linked to diminished overall health outcomes, reduced relationship satisfaction, and an overall reduction in quality of life.^{3,4}

A multidisciplinary Prostate Cancer Supportive Care (PCSC) Program was developed at the Vancouver Prostate Centre in 2013 to address the sequelae of PCa treatments, including the physical and psychological needs of men and their partners, using evidence-based strategies and integrated protocols. The Sexual Health Clinic (SHC) within the PCSC program is comprised of nurses with sexual health training specific to PCa patients and a urologist who subspecializes in sexual health. The SHC is geared towards addressing the challenges of sexual dysfunction that often arise after PCa treatment through a biopsychosocial lens. With the COVID-19 pandemic, the SHC pivoted to provide continuing patient care with virtual telehealth services. As such, since May 2020, the clinic has offered virtual appointments, improving accessibility by overcoming geographic barriers and limited clinical resources.

KEY MESSAGES

- We evaluated clinical outcomes and patient satisfaction with virtual ICI therapy in prostate cancer patients.
- Virtual ICI teaching is effective and comparable to in-person teaching sessions in this setting.
- Sexual health clinicians can consider implementing virtual sessions to increase the accessibility of ICI therapy for patients living outside of large urban centers.
- Conclusions are limited due to the small sample size, the retrospective nature of the study, and the lack of randomization.

For SHC patients who do not respond to phosphodiesterase 5 (PDE5) inhibitors, additional treatments, such as vacuum erectile devices (VEDs), intracavernosal injections (ICI), and medicated urethral system for erection (MUSE), are offered. ICI is one treatment option used to treat erectile dysfunction (ED) following PCa treatment, among other erectogenic aids, such as PDE5 inhibitors and VEDs; however, adherence to any of the current therapy options is low. Up to 80% of men with PCa will discontinue these therapies within one year of initiating the treatment.⁵

While ICI is an effective option, side effects like priapism — although rare — can be serious if not treated promptly. Delayed treatment of acute priapism can lead to pain, the requirement of procedural intervention, cavernosal fibrosis, and worsening ED. Factors such as lack of efficacy, patient or partner discomfort, and cost further contribute to poor long-term adherence. Even among those who continue ICI therapy beyond four months, only half maintain regular use.⁵

We conducted a retrospective study to evaluate the efficacy of platforms for ICI teaching at the SHC. We distributed a patient feedback survey to assess service quality and identify barriers to treatment adherence.

METHODS

Participants

In this retrospective study of non-randomized patients, clinical outcomes and patient satisfaction were compre-

hensively reviewed in individuals who received either virtual ICI or in-person ICI teaching appointments, according to their personal preference. To be included in the analysis, patients must have had a baseline appointment in the SHC, an ICI teaching appointment, and at least one followup appointment three months after teaching. Those who opted for more than one teaching session or booked a mix of virtual ICI and in-person ICI baseline and ICI teaching sessions were excluded from the analysis.

Procedures

The University of British Columbia Clinical Research Ethics Board approved this retrospective chart review (H23-01046), which involved reviewing the charts of patients who attended the clinic between January 2019 and April 2023.

The anonymous survey was administered to patients who had received ICI training at least three months prior. Its purpose was to evaluate service quality and gather insights into patients' challenges in learning injection techniques and maintaining adherence to ICI therapy, with the ultimate goal of improving service delivery. Patient-reported adherence was assessed at three-month, seven-month, and 12-month followup appointments.

ICI teaching

Virtual or in-person ICI training appointments are offered as long as an intake appointment has been completed either in person or virtually. Virtual appointments include a video and voice component. Virtual training appointments are never completed over the phone alone; there is always a video component.

The patient is provided with a prescription, an ICI video, and a detailed step-by-step training booklet before the training appointment, which is led by a specially trained registered sexual health nurse. Patients are required to review this material beforehand and attend the appointment prepared. During the appointment, the clinician begins by discussing how the medication works, frequency of use, and to avoid using it with oral PDE5 inhibitors or intraurethral gel. The clinician then reviews the potential risks, such as infection, Prostin sensitivity, the development of penile scar tissue, and priapism. Infection is minimized through proper sterile needle usage and use of alcohol swabs. For Prostin sensitivity, the patient is advised to monitor for ongoing erection discomfort with injections and to let our clinical team know if it is an ongoing issue so that alternative formulations may be discussed.

To minimize the accumulation of localized fibrosis, the patient is advised to alternate the injection site and side. They are instructed to apply pressure to the injection site for one minute after injecting to prevent bleeding and bruising.

A full page of management instructions are included in the training booklet dedicated to managing priapism. In the event of prolonged erection, the patient is advised to empty their bladder, walk around their home, take a cool shower, or to use a cool compress if the erection is firm for 1–1.5 hours. After two hours of having a prolonged erection, patients are advised to take Sudafed 120 mg. If the erection persists for up to three hours, they are to go to the emergency room.

The sexual health registered nurse also reviews storage of the medication, handling while traveling, expiration date, required supplies for injection, and how to dispose of needles and the sharps container. Next, the patient physically follows along as the nurse demonstrates how to draw up the medication, including how to read the syringe and how to manage air bubbles. Afterwards, the nurse goes over the injection site, landmarking, and different ways of holding the penis for injecting. The injection technique is then demonstrated on a mannequin.

If the appointment is virtual, the patient does not practice self-injecting during the appointment, but all other components are the same as during an in-person appointment. If the appointment is in person, the patient will attempt to self-inject in the clinic with a small amount of medication, typically 3 units. The nurse provides feedback during the process.

After this is complete, the clinician reviews the Erection Firmness Scale to ensure accurate erectile assessment and communication. The suggested dosing schedule is then reviewed with the patient on how to make incremental dose adjustments based on the dose used, erection rigidity, and erection duration. The patient is encouraged to log their injection results and to contact the clinic with any questions or concerns.

Post-appointment, the patient is provided with a priapism emergency letter, a travel letter for traveling with needles, and a justification letter for insurance purposes. See Appendix 1 for an abbreviated review plan (available at cuaj.ca).

Measures

Demographic and clinical variables were collected from electronic health records (EHR), including sociodemographic information, medical history, treatment history, adverse events, and patient-reported outcomes

(PROs). The PROs included measures of sexual satisfaction, sexual interest, erectile function, and the use of and responses to sexual aids. Data were gathered at the initial appointment and during followup appointments using standardized tools, including the International Index of Erectile Function (IIEF)-5⁶ and PROMIS Sexual Function and Satisfaction (PROMIS SexFS) assessments,⁷ as well as pre-appointment questionnaires specific to the SHC. Two domains (Satisfaction with Sex Life and Sexual Interest) from PROMIS SexFS were included to assess self-reported sexual satisfaction.

Statistical analysis

Descriptive statistics were used to analyze patient characteristics and demographics, and data management was done using Microsoft Excel (Microsoft Corporation, Redmond, WA, U.S.) and GraphPad Prism (Dotmatics, Boston, MA, U.S.). Regarding statistical reporting, the number of patients available for each analysis is noted to account for instances where data might be missing or unavailable. Reporting of findings was completed using the Erectile Function Recovery Checklist.⁸

Self-reported sexual satisfaction scores from the initial appointment to followup after ICI teaching were compared. The PROMIS SexFS score conversion tables generated the T-scores. Parametric paired t-tests assessed the significance of changes in these scores.

Additionally, treatment adherence was evaluated using two different methods. The first method considers all patients included in this review. The second method excludes patients who have been discharged, are lost to followup, or have yet to conduct a followup from the total at each time point.

RESULTS

Fifty-four patients who received virtual ICI teaching and 24 patients who received in-person ICI teaching were included in the analysis. The primary goal for most patients attending the teaching sessions was the resumption of sexual intercourse. All patients were in heterosexual relationships and rated their pre-PCa treatment erectile function with a median score of 9/10; however, after undergoing PCa treatment, the median erectile function dropped to 0 for all patients, as shown in Table 1. Both groups had similar demographic profiles, including age, ethnicity, education level, and partner information (Table 1).

In terms of baseline sexual function before starting SHC, 74% in the virtual ICI group and 79% in the in-person ICI group had previously attempted treatment with PDE5 inhibitors, and only one patient in the virtual

Table 1. Patient demographics, erectile function, use of erectile aids, and satisfaction with aids before ICI teaching in SHC for the virtual and in-person clinic groups

	Virtual, n=54	In-person, n=24
Median age, years (range)		
At diagnosis of PCa	61 (46–76) Unknown 1	66 (55–74) Unknown 2
At ICI teaching	65 (48–78)	68 (56–77)
Treatment type, n (%)		
Prostatectomy	48 (89)	18 (75)
Nerve-sparing	36 (67)	11 (46)
No nerve-sparing	7 (13)	2(8)
Unknown	5 (9)	5 (21)
ADT*	8 (15)	9 (38)
EBRT	5 (9)	5 (21)
Other (HIFU/SABR)	1 (2)	1 (4)
Highest education level, n (%)		
University	24 (44)	13 (54)
Non-university diploma	12 (22)	4 (17)
Apprenticeship	7 (13)	1 (4)
High school	7 (13)	5 (21)
Less than high school	2 (4)	0
Unknown	2 (4)	1 (4)
Ethnicity, n (%)		
Caucasian	46 (85)	19 (79)
Asian	3 (5)	2 (8)
Black	2 (4)	0
Indigenous	1 (2)	0
Unknown	2 (4)	1(4)
Partner information, years (range)		
Median age of partner	62 (41–78) Unknown 2	62 (50–73) Unknown 3
Median length of relationship	30 (0–54) Unknown 2	26 (4–55) Unknown 3

*Note: no patients were actively using ADT at the time of ICI teaching. ADT: androgen deprivation therapy; EBRT: external beam radiation therapy; ICI: intracavernosal injection; HIFU: high-intensity focused ultrasound; PCa: prostate cancer; SABR: stereotactic ablative radiotherapy; PDE5is: phosphodiesterase 5 inhibitors; VED: vacuum erectile device.

Table 1 (cont'd). Patient demographics, erectile function, use of erectile aids, and satisfaction with aids before ICI teaching in SHC for the virtual and in-person clinic groups

	Virtual, n=54	In-person, n=24
Erectile function during intercourse 0–10 scale, median (range)		
Before PCa treatment	9 (4–10)	9 (0–10) Unknown 1
After PCa treatment (no aids)	0 (0–6) Unknown 2	0 (0–4) Unknown 4
Erectile aids		
Aid tried, n (%)		
PDE5i	40 (74)	19 (79)
VED	17 (31) Unknown 3 (6)	3 (12) Unknown 3 (12)
ICI	1 (2)	0 (0)
Satisfaction with use of any aid before SHC ICI teaching		
Scale 0–10, median (range)	1 (0–8) Unknown 2	1 (0–7) Unknown 3

*Note: no patients were actively using ADT at the time of ICI teaching. ADT: androgen deprivation therapy; EBRT: external beam radiation therapy; ICI: intracavernosal injection; HIFU: high-intensity focused ultrasound; PCa: prostate cancer; SABR: stereotactic ablative radiotherapy; PDE5is: phosphodiesterase 5 inhibitors; VED: vacuum erectile device.

ICI group had tried ICI therapy before attending the SHC (Table 1).

Both groups reported minimal post-treatment sexual satisfaction using any form of assistance. As shown in Table 1, the median score for post-treatment sexual satisfaction for both groups was merely 1/10. This represents a significant decrease in sexual satisfaction after PCa treatment, with both groups reporting similar baseline satisfaction levels before SHC interventions.

Although there were slight variations in the dosage and best erection duration between the groups, these differences were not significant. Virtual ICI patients used a median dose of 15 (range 1–80) units, with the median duration of the best erection at 30 minutes (range 0–240). In comparison, the in-person ICI group patients used a median of 12 (range 5–100) units, with a median best erection duration of 25 minutes (range 0–240).

Regarding adverse events, one patient in the virtual ICI group experienced an episode of priapism requiring an emergency room visit. One in-person ICI patient had

a partial erection for more than four hours, although this did not meet the criteria for ischemic priapism, as the erection was not rigid. Mild penile discomfort and aching following ICI were reported by three in-person ICI patients and two virtual ICI patients.

At the three-month followup after ICI teaching, 65% (35/54) of the virtual ICI group and 58% (14/24) of the in-person ICI group reported achieving successful erections using ICI therapy (Table 2). Satisfaction levels at three-month followups were similarly modest, with a median satisfaction rating of 3 and 2 for the virtual ICI and in-person ICI groups, respectively, showing slight

Table 2. Details of ICI, erectile function, paired IIEF, and PROMIS 3 months after ICI teaching

	Virtual, n=54	In-person, n=24
Response to ICI, n (%)		
No erection	5 (9)	4 (17)
Penile swelling	14 (26)	6 (25)
Erection firm enough for penetration	35 (65)	14 (58)
Priapism (erection >4 hours resulting in an ER visit)	1 (2)	0
Median (range)		
ICI dose, units	15 (1–80)	12 (5–100)
Best duration of erection, minutes	30 (0–240)	25 (0–240)
Overall satisfaction rating on 0–10 scale, median (range)	3 (0–6) Unknown 11	2 (0–6) Unknown 1
IIEF (with medications), median		
Baseline IIEF	6 (1–25)	6 (5–25)
Followup IIEF	16 (3–15)	10 (4–25)
PROMIS		
Satisfaction with sex life	n=34	n=6
Baseline, mean	42.9 (30.7–56.7)	44.9 (30.7–65.1)
Followup, mean	45.1 (30.7–65.1)	47.4 (37.6–52.8)
Mean difference	+2.2	+2.5
Sexual interest	n=49	n=11
Baseline, mean	48.0 (21.9–60.3)	50.8 (21.9–65.8)
Followup, mean	49.1 (32.9–65.8)	54.3 (43.9–65.8)
Mean difference	+1.1	+3.5

ER: emergency room; IC: intracavernosal injection; IIEF: International Index of Erectile Function; PROMIS: Patient-Reported Outcomes Measurement Information System; SD: standard deviation.

improvement from the median sexual satisfaction level at baseline of 1/10 (range 0–6).

ICI adherence was tracked at the three-month, seven-month, and 12-month followup appointments (Figure 1). At three months, all patients were still under SHC care and reported full adherence to ICI therapy. At the seven- and 12-month time points, six virtual ICI and eight in-person ICI patients had been discharged from the program and could not be assessed for adherence. At seven months, 47/50 (94%) virtual ICI and 16/19 (84%) in-person ICI patients reported continued ICI use. At the 12-month followup, adherence remained higher than previously reported in the literature, with 31/37 (83%) virtual ICI and 14/17 (82%) in-person ICI patients still using ICI therapy.

In 2023, an anonymous quality improvement (QI) survey was distributed to all patients who had received ICI teaching at least three months prior. The survey had a 33% overall response rate, with feedback from 26 individuals, including 17 virtual ICI (31.5%) and nine in-person ICI patients (37.5%). Regardless of the mode of delivery for ICI teaching, an overwhelming majority of respondents, 92%, either “strongly agreed” or “agreed” that the material was presented clearly and was easily understood. Of the 17 virtual ICI respondents, eight (47%) were still using ICI therapy, with five (29%) relying on ICI solely and three (18%) using other aids in conjunction. Among the nine in-person ICI respondents, four (44%) reported still using ICI, with one (11%) using it exclusively and three (75%) combining ICI with other aids.

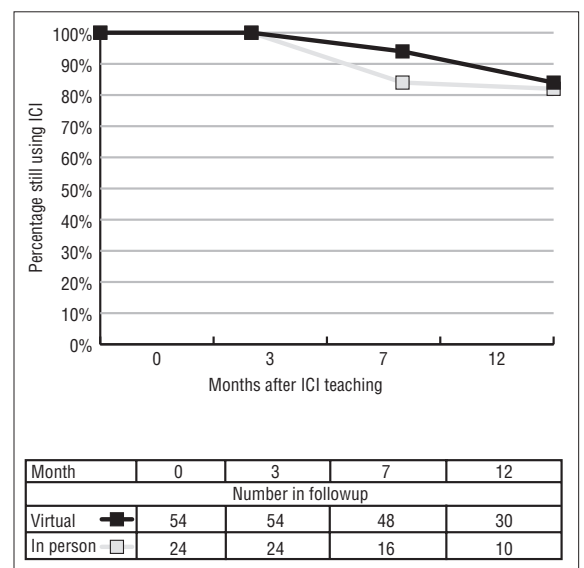


Figure 1. Treatment adherence for virtual and in-person groups as a percentage of those in followup at 3 months, 7 months, and 12 months. ICI: intracavernosal injection.

The QI survey highlighted several challenges contributing to treatment discontinuation, including difficulties in optimizing dosage (n=5, 19%) or achieving desired results (n=10, 38%), penile discomfort or other side effects (n=5, 19%), treatment-related changes in sexual desire (n=4), cost and accessibility issues (n=4, 15%), and partner or personal preferences (n=2, 8%).

DISCUSSION

In this study, we compared clinical outcomes and PROs between virtual ICI and in-person ICI training sessions for PCa patients experiencing ED. We found that both virtual and in-person training resulted in similar clinical outcomes and satisfaction levels, with a noticeable decrease in adherence over time. At three months, adherence rates were 100% for both groups, but this dropped to 83% and 82% for virtual ICI and in-person ICI, respectively, by 12 months.

The low satisfaction with ICI therapy, despite initial high adherence, likely reflects the challenges patients face in maintaining long-term use of ICI. The survey highlighted several factors contributing to this, including difficulties in optimizing dosage, side effects such as penile discomfort, and issues related to partner acceptance.⁹ Psychological barriers, such as anxiety and frustration, may also play a significant role, as evidenced by previous studies,⁹ although our data did not directly assess this. Future research could explore the utility of auto-injection and the impact of psychological support or interventions, such as peer-support groups, to improve long-term adherence. To our knowledge, few studies of ICI auto-injections exist, although reducing the psychological barriers related to self-injection and ED for patients and their partners may improve adherence.^{10,11}

Priapism, a known but rare side effect of ICI therapy, was observed in only one patient in the virtual ICI group, requiring emergency care. This 2% incidence aligns with the lower end of the reported range in the literature (0.5–7%).¹² While priapism remains a concern, our findings suggest it is an infrequent complication when patients are educated about proper dose optimization, the side effects of ICI, including priapism, and strategies to mitigate prolonged erections.

Virtual health offers several advantages, including improved accessibility, reduced costs, and convenience for patients in remote locations. While this study did not specifically measure the environmental impact, virtual healthcare has the potential to reduce the carbon footprint associated with travel; however, challenges such as digital literacy, technology access, and

non-attendance due to technical difficulties must be considered when expanding virtual services.

Limitations

Our study has limitations that should be acknowledged. The small sample size, particularly in the in-person ICI group, limits the generalizability of our findings. The reliance on PROs introduces the possibility of recall bias, and the low response rate to the satisfaction survey (33%) may have skewed the results since these are lower satisfaction rates than previously reported studies; however, previous studies with higher satisfaction rates included those who continue to perform injections, thereby limiting potential negative responses. The current study sent surveys to all patients who received training and not only those who continued ICI therapy.¹³

Furthermore, adherence to ICI among patients included in this study was significantly higher at 12 months (82–83%) compared to the previous literature, with as low as 20% adherence to ICI at one year, perhaps suggesting that the longitudinal support of our program in actively helping patients manage their ICI formulations, dose adjustments, and side effects plays a vital role in treatment adherence and continuity.⁵

Additionally, discontinuation of ICI therapy may not always indicate treatment failure. Recovery of erectile function or the use of other therapies may have played a role, although this was not directly assessed.

Despite these limitations, our study provides preliminary evidence that virtual ICI training is as effective as in-person training. Future research should focus on larger, randomized studies and explore interventions such as auto-injectors and psychological support to enhance long-term adherence and satisfaction.

CONCLUSIONS

Administration of ICI instruction on a virtual platform appears to yield similar outcomes when compared retrospectively to those administered in-person in the clinic. While in-person ICI appointments offer greater patient-provider interaction and allow for physical examinations, virtual ICI appointments provide important advantages, including greater accessibility and minimized physical and economic barriers to receiving timely and effective care.

Our results suggest that virtual teaching is a viable alternative to in-person ICI teaching. Additionally, virtual care may have the potential to reduce the ecological footprint associated with patient travel, although this requires further investigation and validation. Future research should prospectively evaluate teaching meth-

ods with larger sample sizes, longer followup periods, and a focus on addressing psychological barriers that may affect long-term adherence.

COMPETING INTERESTS: Dr. Higano has been a consultant for Astellas, AstraZeneca, Bayer, Genetech, Lilly, Merck, Sharp & Dohme, Myovant, Menarini, Tolmar, Vaccitech, and Verity; and has given expert medical testimony for Ferring. Dr. Flannigan has been a consultant for Boston Scientific and Coloplast; has received honoraria from Ferring and an educational grant from Boston Scientific; and owns Teumo Health Technologies Inc. The remaining authors do not report any competing personal or financial interests related to this work.

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