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Original Research

Functional outcomes after partial penectomy surgery for squamous cell carcinoma penis -an ambidirectional cohort study

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ABSTRACT

Introduction and objectives: Partial penectomy remains the most common surgical procedure for treatment of invasive squamous cell carcinoma of penis. It provides successful local oncological control with adequate urinary and sexual function but there is no consensus in the literature regarding functional outcome after partial penectomy for penile carcinoma.

Method: Patients undergoing partial penectomy for penile carcinoma from Feb 2008 to June 2015 were included in our study. Patients sexual quality of life and urinary function were assessed retrospectively using International Index of Erectile Function (IIEF-15) and Patient Reported Outcome Measures (PROM) for urethral stricture surgery.

Results: Out of 68 patients from our patient database during the study period. Five patients died, 5 had lost to follow up, 6 developed regional lymphadenopathy on follow-up, and 4 had preoperative erectile dysfunction and hence only 48 patients were available for assessment. Out of 26 patients 19 patients (73.07%) reported normal erection but only 11 patients (42.30%) have sexual satisfaction whereas 7 patients (26.92%) have no sexual activity and denied feeling sexual desire. All patients report mild urinary symptoms, most common is decreased strength in 9 patients (34.61%) and require sitting posture to micturate, only 3 patients (11.58%) report metal stenosis and require dilatation. Ninety percent report being satisfied with their procedure.

Conclusion: Our study used standardized, validated questionnaires to evaluate sexual and urinary function in partial penectomy patients. We report excellent overall urinary function and quality of life following partial penectomy for penile carcinoma and our results depict more realistic sexual outcomes than other studies.

Keywords:

INTRODUCTION

Squamous cell carcinoma (SCC) of penis is a rare malignancy with an incidence ranges from 0.7-3 per 100,000 males in India (1). Partial penectomy (PP) is the most common surgical procedure for invasive SCC penis. It provides successful local oncological control with adequate urinary and sexual function(2).Literature regarding functional outcomes after PP is scarce. None of them assess sexual and urinary functions together after PP and its impact on quality of life. We present the functional outcomes afterPPforSCC penis at our centre.

METHODS

Study design

This was a hospital-based ambidirectional cohort study done in patients undergoing partial penectomy forprimary squamous cell carcinoma of the penis in the Department of Urology, in a tertiary care referral centre between February 2008 and June 2015 and followed up for at least one year. Approval was obtained from the Institute Research Review Board and Ethics Committee. We included those patients on follow up for more than 12 months after partial penectomy with no loco regional or systemic recurrence, flaccid penile length (FPL) >3 cm and had normal erectile function (EF) preoperatively.

Surgical technique

All partial penectomy were performed using the standard surgical technique with 1-2 cm surgical margins and dorsal spatulation of urethra over 14F perurethral Foley catheter. The diagnosis and margin status was confirmed on histopathology.

Evaluation

Postoperative patients of partial penecetomy were examined for loco regional recurrence. They

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underwent ultrasound abdomen and chest X-ray to rule out iliac lymphadenopathy and distant metastasis.Those patients with FPL >3 cm, and conforming to the inclusion criteria were identified. They were administered IIEF-15(International Index of Erectile Function) questionnaire for erectile dysfunction and PROM (Patient Related Outcome Measures) questionnaire for urethral stricture surgery to assess lower urinary tract symptoms (LUTS).Each patient evaluated his current sexual and urinary functions and compared it with his premorbid functions.

IIEF-15 (3) assessed sexual function in five domains-erectile function, orgasmic function, sexual desire, intercourse satisfaction and overall satisfaction to calculate specific score for each patients in each domain before and after surgery. PROM assessed changes in voiding symptoms in 3 domains LUTS (Q1-6) module(4,5), LUTS specific Quality of life, Peeling voiding picture(6), with 2 domains for overall HRQOL (EQ-5D) (7) and Q9 and Q10for overall patient satisfaction.

Statistical analysis

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance.

The following assumptions on data is made, Assumptions:

1.Dependent variables should be normally distributed, 2.Samples drawn from the population should be random, Cases of the samples should be independent

Analysis of variance (ANOVA) has been used to find the significance of study parameters between three or more groups of patients , Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters.

Pearson correlation between study variables is performed to find the degree of relationship, Pearson correlation co-efficient ranging between -1 to 1

Significant figures

+ Suggestive significance (P value: 0.05<P<0.10)

* Moderately significant (P value:0.01<P 0.05)

** Strongly significant (P value : P 0.01)

Statistical software: The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1 ,Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS

We identified 68 patients from our patient database during the study period. Five patients died, 5 had lost to follow up, 6 developed regional lymphadenopathy on follow-up,and4 had preoperative erectile dysfunction and hence only 48 patients were available for assessment.

Table 1: Age distribution of patients studied

Age in years	No. of patients	%
31-40	9	18.8
41-50	15	31.3
51-60	10	20.8
61-70	10	20.8
>70	4	8.3
Total	48	100.0

Mean ± SD: 53.17±13.45

Table 2: H/O Comorbidities

H/O Comorbidities	No. of patients (n=48)	%
No	27	56.3
Yes	21	43.8
• DM	3	6.3
• HTN	6	12.5
• DM+HTN	5	10.4
• DM+HTN+CD	6	12.5
• DM+HTN+CVA	1	2.1

Table 3: H/O Smoking

H/O Smoking	No. of patients	%
Negative	30	62.5
Positive	18	37.5
Total	48	100.0

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Table 4: DOF (months)

DOF (months)	No. of patients	%
1-6	5	10.4
7-12	3	6.3
12-24	2	4.2
24-48	18	37.5
>48	14	29.2
NA	6	12.5
Total	48	100.0

Mean ± SD: 43.57±26.02

Table 5: LN

LN	No. of patients	%
No	30	62.5
Yes	18	37.5
Total	48	100.0

Table 7: Assessment of study variables before and after intervention

	Before	After	difference	t value	P value
FPL cm	6.39±0.60	4.26±0.98	2.130	16.106	<0.001**
EF	26.29±2.98	19.40±6.62	6.881	10.851	<0.001**
OF	9.33±0.48	6.29±3.07	3.048	7.071	<0.001**
SD	9.38±0.49	7.31±2.67	2.071	5.450	<0.001**
IS	13.57±0.67	8.88±4.44	4.690	7.712	<0.001**
OA S	9.17±0.38	6.14±3.14	3.024	6.515	<0.001**

Table 8: Assessment of study variables before and after intervention

	Before	After	difference	t value	P value
LUTS	3.19±1.49	10.12±6.39	-6.929	-8.588	<0.001**
Qol	1.00±0.00	1.83±1.17	-0.833	-4.628	<0.001**
Voiding picture	1.00±0.00	2.40±1.21	-1.405	-7.518	<0.001**
HRQol	-	6.79±2.08	-	-	-
OAS	-	1.67±1.05	-	-	-

Table 9: Voiding picture: An assessment

Voiding picture	Before	After	% change
0	0(0%)	6(12.5%)	12.5%
1	42(100%)	11(22.9%)	-77.1%
2	0(0%)	17(35.4%)	35.4%
3	0(0%)	0(0%)	0.0%
4	0(0%)	14(29.2%)	29.2%
Total	42(100%)	48(100%)	-

Table 10: OAS

OAS	Before	After	% change
0	0(0%)	6(12.5%)	12.5%
1	42(100%)	26(54.2%)	-45.8%
2	0(0%)	3(6.3%)	6.3%
3	0(0%)	7(14.6%)	14.6%
4	0(0%)	6(12.5%)	12.5%
Total	42(100%)	48(100%)	-

Table 11a: Comparison of functional outcome Post-op values of FPL(B)

Functional outcome(Pre)	FPL		Total	P value
	≤4 cm	>4 cm		
EF	25.92±0.61	26.82±0.71	26.29±0.46	0.341
OF	9.24±0.09	9.47±0.12	9.33±0.07	0.126
SD	9.32±0.10	9.47±0.12	9.38±0.08	0.336

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IS	13.48±0.13	13.71±0.17	13.57±0.10	0.287
OS	9.16±0.07	9.18±0.10	9.17±0.06	0.892

Table 11b: Comparison of functional outcome Post-op values of FPL(B)

Functional outcome (Post)	FPL		Total	P value
	≤4 cm	>4 cm		
EF	18.92±1.39	20.12±1.52	19.4±1.02	0.571
OF	5.76±0.61	7.06±0.72	6.29±0.47	0.182
SD	7.04±0.56	7.71±0.61	7.31±0.41	0.435
IS	8.08±0.91	10.06±0.99	8.88±0.69	0.159
OS	5.64±0.67	6.88±0.66	6.14±0.49	0.213

Table 12: Pearson correlation of difference of FPL (cm) with difference of functional outcome

	r value	P value
FPL diff **vs** EF diff	0.069	0.663
FPL diff **vs** OF diff	0.345	0.025*
FPL diff **vs** SD diff	0.069	0.663
FPL diff **vs** IS diff	0.364	0.018*
FPL diff **vs** OAS diff	0.335	0.030*

Table 13: distribution of EF in before and after intervention of patients studied

EF	Before	After	% change
0-6	0(0%)	0(0%)	0.0%
7-12	0(0%)	11(26.2%)	26.2%
13-18	0(0%)	1(2.4%)	2.4%
19-24	12(28.6%)	22(52.4%)	23.8%
25-30	30(71.4%)	8(19%)	-52.4%
Total	42(100%)	42(100%)	-

Table 14: Distribution ofin before and after intervention of patients studied

OF	Before	After	% change
0-2	0(0%)	12(28.6%)	8.6%
3-4	0(0%)	3(7.1%)	7.1%
5-6	0(0%)	3(7.1%)	7.1%
7-8	0(0%)	6(14.3%)	14.3%
9-10	42(100%)	18(42.9%)	-57.1%
Total	42(100%)	42(100%)	-

Table 15: Distribution of SD in before and after intervention of patients studied

SD	Before	After	% change
0-2	0(0%)	4(9.5%)	9.5%
3-4	0(0%)	4(9.5%)	9.5%
5-6	0(0%)	5(11.9%)	11.9%
7-8	0(0%)	0(0%)	0.0%
9-10	42(100%)	29(69%)	-31.0%
Total	42(100%)	42(100%)	-

Table 16: Distribution of IS in before and after intervention of patients studied

IS	Before	After	% change
0-3	0(0%)	12(28.6%)	28.6%
4-6	0(0%)	3(7.1%)	7.1%
7-9	0(0%)	1(2.4%)	2.4%
10-12	0(0%)	8(19%)	19.0%
13-15	42(100%)	18(42.9%)	-57.1%
Total	42(100%)	42(100%)	-

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Table 17: Distribution of OA-S in before and after intervention of patients studied

OA-S	Before	After	% change
0-2	0(0%)	12(28.6%)	28.6%
3-4	0(0%)	5(11.9%)	11.9%
5-6	0(0%)	0(0%)	0.0%
7-8	0(0%)	7(16.7%)	16.7%
9-10	42(100%)	18(42.9%)	57.1%
Total	42(100%)	42(100%)	-

Table 18: Trend analysis: Comparison of functional outcome in relation FPL before intervention

Functional outcome-before	FPL Before			Total	P value
	4-5 cm	5-6 cm	>6 cm		
EF	21.00±1.41	26.27±2.74	26.72±2.87	26.29±2.98	0.029*
OF	9.00±0.00	9.40±0.51	9.32±0.48	9.33±0.48	0.536
SD	9.50±0.71	9.40±0.51	9.36±0.49	9.38±0.49	0.915
IS	13.00±0.00	13.47±0.52	13.68±0.75	13.57±0.67	0.294
OA S	9.00±0.00	9.27±0.46	9.12±0.33	9.17±0.38	0.411

Table 19: Trend analysis: Comparison of functional outcome in relation FPL before intervention

Functional outcome-After Intervention	FPL Before			Total	P value
	4-5 cm	5-6 cm	>6 cm		
EF	13.50±2.12	19.47±6.95	19.84±6.59	19.40±6.62	0.438
OF	3.00±1.41	6.80±2.62	6.24±3.31	6.29±3.07	0.263
SD	7.50±2.12	7.40±2.75	7.24±2.76	7.31±2.67	0.979
IS	4.50±2.12	9.47±4.31	8.88±4.57	8.88±4.44	0.340
OA S	2.50±0.71	6.93±3.10	5.96±3.12	6.14±3.14	0.157

Table 20: Difference of functional outcome according FPL

Functional outcome-difference	FPL Before			Total	P value
	4-5 cm	5-6 cm	>6 cm		
EF	7.50±3.54	6.80±4.35	6.88±4.16	6.88±4.11	0.976
OF	6.00±1.41	2.60±2.29	3.08±3.05	3.05±2.79	0.276
SD	2.00±1.41	2.00±2.54	2.12±2.55	2.07±2.46	0.989
IS	8.50±2.12	4.00±3.93	4.80±3.98	4.69±3.94	0.317
OS	6.50±0.71	2.33±2.94	3.16±3.01	3.02±3.01	0.174

Demographic and disease characteristicsTable 1
The mean (± SD) age was 49.69(± 48 years)with a median (IQR) follow-up of 37.03(5-87)months. Themost common pT stage was pT1b (19;40.42%) patients, followed by 9 (19.14%)each with pT2 and, pTa, 6(12.76%) pT1a and 4 (8.51%) with Tis. Clinically inguinal lymphadenopathy was seen in 15 (31.91%) patients at presentation and 9(19.14%) underwent modified ilioinguinal block dissectiondue to persistence despite longterm antibiotics. The median (IQR)FPL was … cm.

Erectile Function (EF)Table 2
In EF domain, 34 (72.34%)reported erection of penile stump hard enough for penetration on most occasions during sexual act which was perceived to be similar to preoperative erections. Six(12.76%) patients had mild to moderate erectile dysfunction(ED), 3 (6.83%)had moderate EDand 4 (8.51%)denied being able to have any erection after PP.

Orgasmic FunctionTable 2
Twenty(42.55%) patients had orgasm and ejaculation "always" during sexual stimulation after PP, 14 (29.78%) had orgasmic activity "sometimes" or "few times" after surgery and 13 (27.65%) patients had no orgasmic function after PP.

Sexual desireTable 2
In 34 (72.34%) patients,sexual desire was perceived similar to that before PP,6 (12.76%) had mild to moderate decrease, 3 (6.83%) had moderate decrease and 4 (8.51%)could not have any sexual desire after PP.

Intercourse Satisfaction: Table 2
Twenty (42.55%) patients were satisfied "almost always" in intercourse and all intercourse attempts very enjoyable as they were before PP,14 (29.78%) hadsatisfaction "sometimes" or "few times" but fairly enjoyable and 13 (27.65%) patients did not perceive any intercourse satisfaction.

Overall Sex Life: Table 2

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Although all 47 patients considered that they were moderately or very satisfied with their sexual life before surgery, only 20 (42.55%) sustained their degree of

satisfaction after PP. Fourteen(29.78%) patients were moderately dissatisfied with their sexual life and13 (27.65%)patients were very dissatisfied with their overall sexual life after surgery.

Reasons for ED:

The main reason for not resuming sexual intercourse appeared to be related to feelings of shame owing to the small penile size and absence of glans penis in 10 of 13 (%) patients, despite average penis length.ELABORATE results and **add table if possible**

Urinary Function:

Mild LUTS were common after partial penectomy in 24 (51.06%)of patients, of whom 6(12.76%)patients had severe obstructive LUTS due to neomeatal stenosis and required neomeatal dilatation. The most common LUTS was poor urinary stream in 14 (29.78%)patients, require sitting posture to void. Quality of life due to LUTS hindered only 6 (12.76%) patients. About 42 (89.36%)patients were satisfied with their surgical procedure. Normal HRQoLwas found in 42(89.36%) patients and5(10.63%)had mild discomfort, anxiety and depression after PP.

DISCUSSION

SCC penis jeopardizes sexual and urinary function and QoL. Conservative treatment with Mohs micrographic surgery, topical chemotherapy, external beam radiotherapy, interstitial brachytherapy, laser and cryosurgery, glansectomy andcircumcision offer excellent cure rates with minimal compromise of sexual and urinary functions.(8,9,10,11)

PPis the most common operation performed for treatment of the primary SCC penis. In spite of local oncological control it also provides additional goal – to preserve the utility to void in standing position and possibly to allow sexual function. Several individually reported impression evidenced that the remaining shaft penis may become erect with excitement and pleasure during sex.3,6. In Norwegian study, they found that sexual function was normal or slightly reduced in only 2 (22%) of 9 patients who undergone partial penectomy.(16) Whereas in Brazalian study sexual function , interest, frequency of intercourse were slightly decrease in 9 (64%) of 14 cases.(17)

We observed a statistically significant decrease occurs in all domain of IIEF-15 after partial penectomy but intercourse satisfaction and overall satisfaction were most affected, with merely 40.03% of patients maintaining their preoperative sexual intercourse frequency and satisfied with their sexual relationship with their partners and their overall sex life.

In contrast, changes in sexual desire and orgasmic function were less pronounced because 73.07% sustained the same frequency and level of erection & sexual desire as before surgery, and 43.03% continued to have ejaculation and orgasm every time they had sexual stimulation or intercourse, where as 26.9% have no sexual activity and denied any sexual desire.

The main reason for not resuming sexual intercourse appeared to be related to feelings of shame owing to the small penile size and absence of glans penis in 10 of 13 (%)patients, despite average penis length. Absence of glans results in decrease in sensations but overtimes the neuronal growth on the lateral and tip of amputated stump leads to give a sexual pleasure in most of patients. Some of patients it had been seen that unconscious fear of unable to perform leads to decrease in sexual function. Multidisciplinary follow-up with psychologists trained in sex therapy is necessary and should begin when treatment is being decided (6) to help patients and their partners to discuss their feelings and facilitate the return of sexual functioning. Patients should be reassured that although their penis will be smaller after surgery, it may be possible to penetrate the vagina and have pleasant sexual intercourse. Pretreatment education may even prevent psychologically based sexual problems.(6)It is well-known that the prevalence of erectile dysfunction increases with age. Given that penile carcinoma most frequently appears later in life, some patients may develop erectile dysfunction after treatment.It has been shown that 27.3% of patients have ED after circumcision depicting the psychogenic effects associated with any penile surgery.[ref]

The strength of this study is large sample size and exclusion of patients with prior ED. Due to its retrospective nature, recall bias is an important drawback of this study.

CONCLUSION

Partial penectomy was associated with good recovery in sexual function after surgery. Most patients regained their erection, sexual desire and orgasm. Those with sexual dysfunction had psychological reasons. Voiding in standing posture was possible in most patients. Pyschological counseling would be beneficial in regaining the sexual function after PP.

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