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Research Article

The Role of Surgical Androgen Deprivation in the Treatment of Patients With Urine Retention Due to Prostate Cancer

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Abstract

Background: Surgical androgen deprivation (SAD) and temporary urethral catheterization remain the most suitable therapy for locally advanced prostate cancer (PC). This study aimed to assess the suitable interval duration for voiding trial without a catheter (TWOC) after SAD and to correlate the Gleason score, prostate volume, and PSA level with the free-catheter voiding success.

Methods: A total of 62 patients with urine retention due to PC were included in this study. PSA, pelvic ultrasound, and Gleason score were done prior to SAD as baseline measurements and repeated four weeks after surgery. Initial two-week voiding TWOC was done for all patients and repeated after two weeks for patients who failed the initial voiding TWOC.

Results: The results showed that 34 (54.8%) patients had Gleason score >7, 21 (33.9%) had a score of 7, and 7 (11.3%) had a score <7. Following SAD, the mean prostate size reduction was seen in 36 (58%) patients, whereas PSA ranged between 0.87 and 38 ng/ml with a mean reduction level of 10.9 ng/ml. All patients with Gleason ≤7 could void free one month after SAD. Five patients with Gleason >7 failed to void free and needed TURP tunneling. In summary, 39 (62%) were void-free after two weeks, 18 (29%) after one month, and the remaining 5 (8.1) required tunneling TURP.

Conclusion: The initial TWOC should start two weeks after SAD and followed by a second voiding TWOC two weeks later. Those who fail the second voiding TWOC usually have high Gleason scores, and tunneling TURP may be the best option to treat such patients.

Keywords: prostate cancer, androgen ablation, urine retention, subcapsular orchiectomy

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1. Introduction

Prostate cancer (PC) represents the sixth leading cause of cancer death among men and the second most common cause of cancer worldwide. With the recently increased global population age, one would expect increases in new PC cases and deaths during the next decade [1].

Acute urine retention (AUR) and/or erectile dysfunction are the most frequent complications occurring in patients with localized PC, accounting for 13.2% of all cases [2]. The treatment objectives of locally advanced PC are curing retention, preventing severe complications, and improving patients' quality of life [3]. Several urologists prefer to combine Surgical androgen deprivation (SAD) and tunneling TURP in one session as the best treatment for outlet obstruction since it provides immediate relief, reduces the risk of infection associated with prolonged urethral catheterization, and prevents additional anesthesia for late tunneling TURP [4]. Certainly, combining tunneling TURP with SAD may provide immediate relief of the obstruction, but the risk of tumor dissemination and seeding, which may result in residual tumor and bleeding, remains a considerable risk [5]. However, all agreed on the SAD procedure as effective, simple to perform under local anesthesia, and cost-effective even for countries with low health resources. Thus, most urologists agree that SAD and temporary urethral catheterization remain the optimum therapeutic modality for bladder outlet obstruction due to PC [6]. The primary debate centers around the best approach, which can be the combined SAD and tunneling TURP, or SAD flowed by a 1–2-month interval before the voiding trial without a catheter (TWOC). However, there has yet to be a consensus for the second approach about the optimal time interval for the voiding TWOC after SAD and when delayed tunneling TURP becomes a necessity.

In the present study, we aimed to assess the efficiency of subcapsular orchiectomy in the treatment of patients with urine retention due to carcinoma of the prostate, and the optimum postoperative time for voiding TWOC. The study also aimed to assess the effect of subcapsular orchiectomy on the prostate size and the reduction of PSA level and to correlate the Gleason score, prostate volume, and PSA level with the voiding TWOC success rate.

2. Methods

A total of 65 patients presented between January 2019 and December 2019 to the Department of Urology at the Military Hospital and Soba University Hospital and were enrolled in a prospective cross-sectional hospital-based study. All patients who presented with a complain of urine retention (catheterized) due to PC were enrolled in the study. Those with PC and without urine retention or who received any form of management other than subcapsular orchiectomy were excluded from the study.

Measurements of total serum PSA, pelvic ultrasound, digital rectal examination, and directed prostatic biopsy were done for all patients as baseline measurements for PSA and prostate size before being repeated one month later. The histological diagnosis and Gleason score were done according to the WHO grading system [7].

For all patients, subcapsular orchiectomy was performed under spinal anesthesia or local anesthesia when required. In all cases, a urology resident doctor operated through midline (Midraphy). A small scrotum incision was opened in layers, tunica vaginalis was opened, and all

testicular tissue2 was removed. Then, the tunica and scrotum were closed in layers. All patients were urethral catheterized for two weeks after subscapular orchiectomy before being subjected to a voiding TWOC. Those who failed to pass urine were re-catheterized and given another voiding TWOC after two weeks. Patients who failed to void urine after one month were subjected to tunneling TURP. All patients succeeded to pass urine within two to four weeks, followed by abdominal ultrasound to assess prostate size and measurement of serum PSA one month following subcapsular orchiectomy.

2.1. Statistical analysis

Data results were analyzed using the Statistics Program for Social Science (SPSS) version 20. Descriptive statistics described the variables as frequencies, mean, and percentages. The Chi-square Pearson's test was used to determine the significant differences. *P*-value was considered significant at ≤ 0.05.

3. Results

Of the 65 patients enrolled in this study, two died after the surgery, and one was lost during the follow-up process. The results of the remaining 62 patients showed that the patients' ages ranged between 41 and 85 years, with a mean age of 68.9 ±7.6 years. The most common age group was 61–85 years, accounting for 88.7% of the patients, followed by patients aged 41–60 years, representing only 11.3% of the patients. All patients who failed the voiding TWOC after one month were from the age group above 60 years and hence needed tunneling TURP (Table 1).

Out of all patients, 44 (71%) experienced urine retention for less than a month, while 16 (25.8%) had urine retention for more than a month but less than two months. Only a minimal number of patients, two (3.2%) patients, were catheterized for over two months. Most patients, 55 (88.7), who presented with urine retention for less than two months managed to void free four weeks after the surgery. The remaining five (8.1%) patients needed tunneling TURP. Only two of the patients presented with a urethral catheter for more than two months, and interestingly, they did very well after SAD and voided free of the catheter after only two weeks (Table 2).

The initial baseline measurement of the PSA showed 15 (23.2%) patients with PSA <80 ng/ml, whereas the remaining 47 (75.8) patients had PSA levels of >80 ng/ml. The results also showed that all patients with initial PSA <80 ng/ml responded well to the SAD and could void free one month after surgery. All four (6.5%) patients who underwent tunneling TURP presented initially with a high PSA of >100 ng/ml (Table 2). One month after SAD, the measurement results of the PSA showed a dramatic decrease in PSA with a mean of 10.9 ng/ml ranging between 0.87 and 38 ng/ml, of which 18 (29%) patients had PSA <5 ng/ml, and only 10 (16.1%) patients had PSA >20 ng/ml (Table 3).

The average size of the prostate before SAD was 91 cc. After one month of undergoing subcapsular orchiectomy, the prostate size was reduced by an average of 58%. Among the patients, 30.6% experienced a reduction of 61–70% in prostate size, 21% had a reduction of >70%, 38.7% showed a ranging reduction rate between 41% and 60%, and only 9.7% had a reduction of <40% in prostate size. A total of 32 (51.6%) patients showed a significant reduction in prostate size, >60%, of whom 29 (90.6%) passed the voiding TWOC after one month (Table 2).

Table 1: Data (age, retention duration, prostate size, PSA, and Gleason score) of 62 patients.

Groups	Sub groups	Frequency	Percentage (%)
Age (yr)	40–50	1	1.6
	51–60	6	9.7
	61–70	38	61.3
	>70	17	27.4
Urine retention duration (month)	<1	44	71.0
	1–2	16	25.8
	2.01–3	2	3.2
Baseline U/S prostate size	<50	1	1.6
	50–100	47	75.8
	101–150	9	14.5
	>150	5	8.1
Baseline PSA (ng/ml)	<20	2	3.2
	20–50	6	9.7
	51–80	7	11.3
	81–100	4	6.5
	>100	43	69.4
Gleason score	<7	7	11.3
	7	21	33.9
	>7	34	54.8

Gleason score of >7 was seen in 34 (54.8%) patients, while 21 (33.9%) patients scored 7, and the remaining 21 (11.3%) scored <7 (Table 1). The results also showed a strong relation between the successful voiding trial and the Gleason score. The data showed that 47.1% of patients who responded within two weeks had a low Gleason score of >7, and 85.3% responded within four weeks. All five patients who failed to pass urine one month after SAD showed high Gleason score of >7, and hence needed channeling TURP (Table 2).

Catheter-free trials were initiated two weeks following SAD and were successful in 39 (62.9%) patients. The remaining patients who failed the initial first two weeks' trial were given another trial after another two weeks, in which 18 (29%) patients could void without a urethral catheter. Only five patients were unable to pass urine one month after SAD, and hence were offered the channeling TURP procedure (Table 2).

4. Discussion

Prostate cancer ranks as the first cancer among Sudanese men and accounts for 7.6% of all cancer types in this country [8, 9]. Worldwide, it represents the second most common cause of cancer among men [10]. The observed rising number during the last decades was perhaps due to the introduction of the PSA test and its ability for early detection. However, the vast majority of PC patients also present with urine retention that requires treatment in addition to their cancer disease. Unfortunately, the ideal treatment for urine retention in patients with locally invaded PC is still debatable among urologists [11]. Although androgen ablation is known to reduce prostate size, enhancing the

Table 2: The results of the initial and second free-voiding trials in 62 patients.

Groups	Subgroups	Interval and frequency of voiding TWOC			Total (within the group)
		2 Weeks	4 Weeks	TURP	
Age (yr)	40–50	1 (2.6%)	0 (0.0%)	0 (0.0%)	1 (1.6%)
	51–60	4 (10.3%)	2 (11.1%)	0 (0.0%)	6 (9.7%)
	61–70	23 (59.0%)	11 (61.1%)	4 (80.0%)	38 (61.3%)
	>70	11 (28.2%)	5 (27.8%)	1 (20.0%)	17 (27.4%)
Urine retention duration (month)	<1	29 (74.4%)	12 (66.7%)	3 (60.0%)	44 (71.0%)
	1–2	8 (20.5%)	6 (33.3%)	2 (40.0%)	16 (25.8%)
	2.01–3	2 (5.1%)	0 (0.0%)	0 (0.0%)	2 (3.2%)
Reduction in prostate size	<40	3 (7.7%)	3 (16.7%)	0 (0.0%)	6 (9.7%)
	41–50	5 (12.8%)	5 (27.8%)	1 (20.0%)	11 (17.7%)
	51–60	9 (23.1%)	3 (16.7%)	1 (20.0%)	13 (21.0%)
	61–70	13 (33.3%)	5 (27.8%)	1 (20.0%)	19 (30.6%)
	>70	9 (23.1%)	2 (11.1%)	2 (40.0%)	13 (21.0%)
Baseline PSA (ng/ml)	<20	2 (5.1%)	0 (0.0%)	0 (0.0%)	2 (3.2%)
	20–50	6 (15.4%)	0 (0.0%)	0 (0.0%)	6 (9.7%)
	51–80	6 (15.4%)	1 (5.6%)	0 (0.0%)	7 (11.3%)
	81–100	2 (5.1%)	1 (5.6%)	1 (20.0%)	4 (6.5%)
	>100	23 (59.0%)	16 (88.9%)	4 (80.0%)	43 (69.4%)
Gleason score	<7	6 (15.4%)	1 (5.6%)	0 (0.0%)	7 (11.3%)
	7	17 (43.6%)	4 (22.2%)	0 (0.0%)	21 (33.9%)
	>7	16 (47.1%)	13 (38.2%)	5 (14.7%)	34 (54.8%)
Total frequency and percentage		39 (62.9%)	18 (29.0%)	5 (8.1%)	62 (100.0%)

Table 3: The PSA serum results in 62 patients after one month of SAD.

PSA ng/ml	Number of patients	Percentage
0.5–5	18	29.0
5.01–10	18	29.0
10.01–15	10	16.1
15.01–20	6	9.7
>20	10	16.1
Total	62	100.0

chance of free catheter voiding, in some patients, the effect of androgen ablation may fail to relieve urine retention. Hence, TURP tunneling becomes unavoidable, although there is a risk of cancer dissemination. So, identifying patients with potential good responses to surgical androgen ablation is urgently needed, considering the low-complication risk and reducing cost.

The present study showed a significant reduction in PSA values after the first month of subcapsular orchiectomy. These results are in complete agreement with the previous studies in

which PSA drops occur up to 80% within one month following SAD and significantly prolong free survived disease progression [12, 13]. However, our study also showed a similar reduction of 70% in 21% of the patients and a 50% reduction in 72.6% within the first month.

According to the results of the study, SAD is an effective therapeutic strategy to treat urine retention in patients with PC. The vast majority of our patients respond well to simple surgical androgen ablation, considering the simplicity of the procedure –which is done mainly by a residence registrar – and the low cost compared with transurethral tunneling of the prostate, especially in countries with low currency and limited health resources. Most of our patients (91.9%) managed to void catheter-free after one month. For the remaining patients who failed to stay catheter-free after one month and failed to void satisfactorily after 60 days, tunneling TURP was performed. However, unlike in a previous study where 12% of the patients developed recurrent retention after five months of follow-up [14], we failed to follow-up with our patients. Therefore, keeping a urethral catheter for more than a month after surgical hormonal ablation is not justified, and that transurethral tunneling is advised for those patients [15].

All five patients with Gleason scores over 7 failed to pass urine after one month and required tunneling TURP compared to patients with lower Gleason scores, who responded well to SAD and voided successfully within one month. This result supports the correlation between the Gleason score and the success of voiding TWOC after SAD (P-value = 0.052).

However, several studies showed that neither tumor stage nor grade correlated significantly with the response to subcapsular orchiectomy. In contrast, other studies demonstrate a significant correlation between poorly differentiated tumors and the probability of tunneling TURP treatment [15, 16].

The authors of this study acknowledge the relatively smaller sample size, which may have restricted the ability to thoroughly explore the impact of other variables on the study outcome. Furthermore, the brief follow-up period employed in the study design has potentially obscured the possibility of future changes in the outcome of the intervention under examination. Nevertheless, the value and the cost-effectiveness of bilateral subcapsular orchiectomy as androgen deprivation therapy are well documented in several previous studies in which it provides higher quality-adjusted survival except for patients with short anticipated survival as current medical androgen suppressive treatment options are costlier than bilateral subcapsular orchiectomy [17].

5. Conclusion

The vast majority of the patients (91.9%) were able to void urine adequately one month after SAD. Subcapsular orchiectomy is a simple, effective, and low-cost alternative to the combined SAD and TURP tunneling for patients with PC and urine retention. Patients who retained urine for more than one month following bilateral subcapsular orchiectomy usually had high Gleason scores and were unlikely to respond. Hence, keeping a catheter for more than one month following SAD is not justified, and patients may benefit from TURP tunneling.

Declarations

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Ethical Considerations

The Ethical Committees at the Sudan Medical Specialization Board (SMSB), Military Hospital, and Soba University Hospital granted ethical approval for this study. Patients received counseling sessions about the medical and surgical treatment of locally advanced PC associated with urine retention. Only patients who agreed on SAD signed the written informed consent and enrolled in this study. All patients' data were coded and kept anonymous.

Competing Interests

The authors declare that they have no competing financial or related interests.

Availability of Data and Material

Available upon reasonable request to the corresponding author.

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Abbreviations and Symbols

SAD: Surgical androgen deprivation

TWOC: Trial without a catheter

AUR: Acute urine retention

PC: Prostate cancer

SMSB: Sudan Medical Specialization Board

SPSS: Statistics Program for Social Science

TURP: Transurethral resection of the prostate

WHO: World Health Organization

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