EVALUATION OF THE EFFECT OF NERVE-SPARING (NS) VERSUS NON-NERVE-SPARING (NNS) ROBOT-ASSISTED LAPAROSCOPIC RADICAL PROSTATECTOMY (RALP) ON THE INTRAOPERATIVE AND EARLY POSTOPERATIVE PARAMETERS

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ABSTRACT:

Introduction and Background: Prostate cancer is considered the most common cancer in men in the UK. Radical prostatectomy is one of the most common treatment options for the organ-confined disease. Nerve-sparing is the key for a better functional result. Our research is designed to evaluate the effect of the nerve sparing procedure on the intraoperative and early postoperative parameters. **Material and methods:** A retrospective comparative study carried out in Southend University Hospital, United Kingdom and Cairo University Hospital, Egypt. Patients with localized/locally advanced prostate cancer treated with RALP between April 2019 and October 2021 were included. These were classified into three groups: 1) NNS, 2) unilateral NS, and 3) bilateral NS RALP. Intraoperative data (including console time and estimated blood loss) as well as the length of hospital stay were recorded. **Results:** Our study included 205 patients: 101 NNS, 62 unilateral NS, and 42 bilateral NS. The mean age was 68.8, 63.7, and 62.9 years respectively. There was no statistically significant deference on comparing the mean console time among the three groups (2.58 h, 2.58 h and 2.71 h respectively), (P value=0.71). On comparing the estimated blood loss among the three groups, no statistically significant deference was demonstrated as well (mean value of 91.4 ml, 89.5 ml. and 86.9 respectively), (P value=0.763). And again, on comparing the length of the hospital stay among the three groups, no statistically significant difference was shown (mean value of 1.04, 1.02 and 0.95 days respectively), (P value=0.258). **Conclusion:** Nerve-sparing procedures can be used aiming for better functional results without adverse effect on the intraoperative and the early postoperative parameters.

Keywords: Robotic prostatectomy, nerve-sparing, operative time, length of hospital stay, estimated blood loss.

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INTRODUCTION:

Prostate cancer is considered the second most commonly diagnosed cancer among men worldwide with an estimated 1,414,259 new cases in the year 2020.[1] In the United States and United Kingdom, prostate cancer is the most common cancer in men. One in eight men is expected to be diagnosed with prostate cancer in his lifetime.[2]

Radical prostatectomy is one of the most adopted treatment options in the localized and locally advanced disease especially when the life expectancy is more than 10 years.[3] Although the oncological outcome is very important, the functional outcome is not less important especially in young sexually active patients.[3] Preservation of the neurovascular bundles (NVBs) is the key to a better functional result.[4,5,6] Different surgical techniques have been proposed to preserve the neurovascular bundles.[7] The purpose of our research is to evaluate the effect of the nerve sparing versus non-nerve-sparing robot-assisted laparoscopic radical prostatectomy (RALP) on the operative time, estimated blood loss (EBL) and the length of the hospital stay (LOS).

MATERIAL AND METHODS:

This study is a retrospective comparative study carried out in Southend University Hospital, United Kingdom and Cairo University Hospital, Egypt. Patients with localized/ locally advanced prostate cancer who underwent robot-assisted laparoscopic radical prostatectomy (RALP) between April 2019 and October 2021 were included in our research. We excluded patients with incomplete records and those who underwent a salvage operation.

The operation was done on Davinci X system. This was either non-nerve sparing RALP or nerve-sparing (unilateral or bilateral). We used anterior approach in most of our cases when we start with dropping down the urinary bladder. In case of a large prostate more than 80 cc, we start posteriorly by developing the plan between the prostate and

perirectal fat till the apex, then continue anteriorly like small prostates. In case of non-nerve-sparing approach, the endopelvic fascia is incised sharply and the Levator Ani muscle is peeled laterally without using cautery, while in nerve-sparing procedures the endopelvic fascia is left intact on the same side. After opening the bladder neck, the Denonveilliers fascia is sharply incised, and a posterior plane is developed between it and the perirectal fat, if this step was not done at the beginning. Then, in case of non-nerve sparing, wide excision of the lateral prostatic pedicles and NVBs using Hem-O-Lok® clips and monopolar scissors. In case of nerve-sparing, a plane is developed between the prostate and the prostatic fascia. The technique used for nerve-sparing was an antegrade intrafascial athermal approach, where the fascia is peeled laterally away from the prostate capsule without using cautery or traction, small blood vessels are controlled by 5mm Challenger® metal clips.

All the procedures were carried out by a single surgeon. Our study included 205 patients: 101 NNS, 62 unilateral NS, and 42 bilateral NS. The mean age was 68.8, 63.7, and 62.9 years respectively. The patients were classified into three different groups: non-nerve-sparing (NNS), unilateral NS and bilateral NS. The operative data were recorded including the console time and the estimated blood loss (EBL). Also, the length of the hospital stay (LOS).

Also, preoperative and postoperative date were recorded for assessment of the oncological and functional outcome.

Data were analyzed using IBM SPSS advanced statistics (Statistical Package for Social Sciences), version 27 (SPSS Inc., Chicago, IL). Numerical data were described as mean and standard deviation. Data were explored for normality using Kolmogrov-Smirnov test and Shapiro-Wilk test. Comparisons between the 3 groups for normally distributed numeric variables were done using ANOVA followed by Bonferroni post hoc test. A p-value less than or equal to 0.05 were considered statistically significant. All tests were two tailed.

RESULTS:

Comparison between the mean operative time among the three groups is shown below. Although the mean console time was slightly longer in the Bilateral NS group (2.71 h) compared to the other two groups (2.58 h), data analysis with ANOVA followed by Bonferroni post hoc test showed no statistically significant deference between the three groups in the mean console time (P value=0.7).

Table (1): Comparison between the mean operative time among the three groups.

	NNS		Unilateral NS		Bilateral NS		
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**P value**
Duration (h)	2.58	0.83	2.58	0.89	2.71	0.78	0.700

P<0.05 is Statistically significant, NNS: non-nerve sparing, NS: nerve sparing, duration measured in hours. SD: standard deviation.

Comparison between the intraoperative estimated blood loss (EBL) among the three groups is shown below. Data analysis with ANOVA followed by Bonferroni post hoc test showed no statistically significant deference between the three groups in the mean estimated blood loss (P value=0.763).

Table (2): Comparison between the estimated blood loss among the three groups.

	NNS		Unilateral NS		Bilateral NS		
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**P value**
EBL (ml)	91.41	36.45	89.52	31.54	86.9	29.34	0.763

P<0.05 is Statistically significant, NNS: non-nerve sparing, NS: nerve sparing, EBL: estimated blood loss measured in mls. SD: standard deviation.

Comparison between the length of hospital stay (LOS) among the three groups is shown below. Data analysis with ANOVA followed by Bonferroni post hoc test showed no statistically significant deference between the three groups in the length of hospital stay (P value=0.258).

Table (3): Comparison between the length of hospital stay among the three groups.

	NNS		Unilateral NS		Bilateral NS		
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**P value**
LOS (days)	1.04	0.28	1.02	0.29	0.95	0.31	0.258

P<0.05 is Statistically significant, NNS: non-nerve sparing, NS: nerve sparing, LOS: length of hospital stay measured in days. SD: standard deviation.

DISCUSSION:

The widespread of the screening protocols for prostate cancer and advancement in the imaging modalities and biopsy techniques have led to an early diagnosis of prostate cancer. The functional outcome especially the urinary continence and sexual function are now very important specially for young sexually active patients undergoing radical prostatectomy. Nerve-sparing techniques are becoming increasingly adopted aiming for a better functional result. Although research suggests the positive impact of the nerve sparing approach on the functional outcome but there was always a fear that such approach may prolong the operative time or lead to increased intra or postoperative complications. Our research showed no statistically significant differences between the nerve-sparing techniques versus the non-nerve-sparing technique in the operative and early postoperative parameters including the operative time, estimated blood loss and the length of hospital stay.

Violette et. al. in his research stated that multivariable logistic regression revealed four independent predictors of prolonged operative time not including the nerve-sparing approach: blood loss (6.5 min/100 ml), pre-operative PSA (10 min/10 ng/ml), robot malfunction (32 min/malfunction), and gland volume (3 min/10 cc).[8] In contrary to that, Young et. al. reported that nerve sparing was one of the independent predictors of prolonged operative time, P value 0.023.[9]

Predicting the operative time is important for planning the surgery and anesthesia, also for the hospital management. The limitations of our research were that it was a retrospective study without a full control on patients' enrollment and other parameters were not studied. We suggest more research to be done on that aspect including prospective studies, studying other factors that may influence operative time and studying the effect on more intraoperative and early postoperative parameters like patient's recovery, postoperative pain, and hematuria.

CONCLUSION:

Nerve sparing can be done aiming for better functional results without affecting the operative time, estimated blood loss or the length of hospital's stay.

REFERENCES:

1) Sung, H., Ferlay, J., Siegel, R.L., Laversanne, M., Soerjomataram, I., Jemal, A., Bray, F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J. Clin.* **2021**, *71*, 209–249.

2)Cancer Registration Statistics, https://digital.nhs.uk/data-and-information/publications/statistical/cancer-registration-statistics/england-**2019**, accessed 08/2023

3) Walsh PC, Donker PJ. Impotence Following Radical Prostatectomy: Insight into Etiology and Prevention. J Urol. **2017**;197:S165-S170.

4) Kumar A, Patel VR, Panaiyadiyan S, Seetharam Bhat KR, Moschovas MC, Nayak B. Nerve-sparing robot-assisted radical prostatectomy: Current perspectives. Asian J Urol. **2021**;8:2-13

5) Bhat KRS, Moschovas MC, Onol FF, Rogers T, Reddy SS, Corder C, et al. Evidence-based evolution of our robot-assisted laparoscopic prostatectomy (RALP) technique through 13,000 cases. J Robot Surg. **2021**;15:651-60.

6) Covas Moschovas M, Bhat S, Onol FF, Rogers T, Roof S, Mazzone E, et al. Modified Apical Dissection and Lateral Prostatic Fascia Preservation Improves Early Postoperative Functional Recovery in Robotic-assisted Laparoscopic Radical Prostatectomy: Results from a Propensity Score-matched Analysis. Eur Urol. **2020**;78:875-84

7) Kyriazis, I.; Spinos, T.; Tsaturyan, A.; Kallidonis, P.; Stolzenburg, J.U.; Liatsikos, E. Different Nerve-Sparing Techniques during Radical Prostatectomy and Their Impact on Functional Outcomes. *Cancers* **2022**, *14*, 1601.

8) Violette PD, Mikhail D, Pond GR, Pautler SE. Independent predictors of prolonged operative time during robotic-assisted radical prostatectomy. J Robot Surg. **2015** Jun;9(2):117-23.

9) Yong D. , Tsivian M. , Zilberman D. , Ferrandino M. , Mouraviev V. , Albala D.. Predictors Of Prolonged Operative Time During Robot-assisted Laparoscopic Radical Prostatectomy. BJU International **2010**;107(2):280-282.