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ORIGINAL RESEARCH

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The effect of the discrepancy between pre- and post-operative staging on decision-making and quality of life in men undergoing a radical prostatectomy

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Abstract

Prostate cancer is the most prevalent cancer and the second leading cause of oncological mortality in men. Its prognosis is estimated by normograms based on statistical methods. However, it is still a challenge to accurately determine the pathological stage from clinical data. Our aim is to describe and analyze the relationship between sociodemographic, quality-of-life and clinical variables in patients undergoing a radical prostatectomy. A cross-sectional observational study was carried out and included 51 patients undergoing a radical prostatectomy in a general hospital in southeastern Spain. The normality of all variables was studied. A descriptive and association/correlation analysis of the most relevant variables of the study was carried out. In addition, a multivariate analysis was performed to study the intergroup differences between variables with significant correlation. Age was related to a higher occurrence of erectile dysfunction (f = 10.594, p = 0.09) and to a lower percentage of consultations for this reason (x^2 = 6.996, p = 0.012). Overweight/obese patients had a more aggressive result on the Gleason score (w = 151.5, p = 0.019). Differences were found between ultrasound and surgical specimen prostate volume (f = 10.324, p = 0.004). There were differences between the Gleason score result obtained from the biopsy and the surgical specimen (f = 23.330, p = 0.00001). Our results suggest that older age could be related to increased erectile dysfunction, that obesity could be related to more aggressive prostate cancer, and that there can be differences in the Gleason score between the biopsy and the final specimen. These findings suggest that the Gleason score results should be interpreted cautiously.

Keywords

Prostate cancer; Prostatectomy; Staging; Gleason score

1. Introduction

Prostate cancer (PCa) is the most prevalent cancer and the second leading cause of cancer mortality in men [1]. Prostate tumours are the fourth most common tumour worldwide with an estimated 1,414,259 (7.3%) new cases in 2020 [2]. In Spain, PCa is the second most frequent cancer [3] and it accounts for 12.9% of newly diagnosed cases [4]. The northwest and southwest are areas with high mortality from PCa compared to the rest of the country [5].

PCa incidence data vary considerably throughout the world [6]. This may be explained by the use of Prostate-Specific Antigen (PSA) as a screening method [7]. However, a clear geographical predominance has been observed in regions of African-American ethnicity [8]. Therefore, some authors question whether this great difference between areas is due to screening alone [9].

Age is the main risk factor for PCa [6]. A study in the USA linked the incidence of PCa with advanced age, African ethnicity and family history [10]. The importance of androgens in its aetiopathogenesis has also been widely reported [11]. However, only one prospective research study measuring serum testosterone in relation to the occurrence of PCa showed a statistically significant increase in risk [12]. Men with hypogonadism had a lower risk of PCa [13], while treatment with exogenous testosterone is not associated with an increased risk [14]. Currently, no clear relationship has been found between serum testosterone levels and the appearance of PCa [15].

PCa staging allows for an estimation of prognosis and is involved in therapeutic decision-making [16]. Pre-surgical clinical staging is based on a digital rectal examination [17], PSA [18] and the transrectal biopsy Gleason score [19]. The post-surgical pathological stage is based on the analysis of the

surgical specimen [20]. Magnetic resonance (MRI) is the most accurate imaging test to assess the PCa stage, modifying the initial surgical template in 35% of cases [17]. However, MRI is not widely used when deciding which surgical approach should be followed [20]. Aside from being traditionally used to guide repeated biopsies in order to improve the detection of clinically relevant PCa and the accuracy of the Gleason score, the multiparametric-MRI has also emerged as a tool to determine clinical tumour aggressiveness [17].

A radical prostatectomy (RP) is recommended when aiming to cure resectable disease, which often affects patients' quality of life [21]. It can have physical consequences such as male sexual dysfunction (MSD) [22, 23], urinary incontinence [24, 25], and future bowel disturbances, including recurrent subocclusive symptoms [26]. MSD includes hypoactive desire disorder [27], erectile dysfunction [28], and orgasm [23] and ejaculation disorders [29]. MSD has a great impact on quality of life [30, 31] with erectile dysfunction being of greatest concern [32]. Other psychological and emotional alterations related to the disease have also been described [33], such as the effect on self-esteem [34], irritability or fear [35]. In addition, the distress felt by men undergoing RP also contributes to the suffering of their family members, who play a key role in caregiving and emotional support [36]. The patients undergoing RP also experience significant repercussions on their social lives and on their relationships with their families and partners [37]. The psychosocial implications of the disease and the decision-making process for its treatment are very expensive for the system [38], which is why some authors advocate including psychosocial costs in the financial evaluations of healthcare systems [39].

Several studies report clinical understaging of the disease when compared to the pathological staging obtained after RP. Thirty percent of patients with a Gleason score of 6 in preoperative biopsy specimens have a higher Gleason score after surgery. In those with a Gleason score of 7 or higher, this increases to 34.5% of cases [40]. The therapeutic management of PCa has serious repercussions on both the sexual [21] and socio-familial spheres [37]. Therefore, clinicians require tools to be able to determine the final pathological stage accurately. According to some authors, this continues to be a challenge in routine clinical practice [41]. For this reason, we consider it advisable to carry out a study that compares pre-PR and post-PR variables, and analyze their behaviour to ensure correct decision-making prior to choosing the targeted treatment. The aim of this study is to describe and analyze the relationship between sociodemographic factors, quality-of-life and clinical variables in patients undergoing a radical prostatectomy.

2. Materials and methods

2.1 Study design

This is a cross-sectional observational study conducted in a general hospital in southeastern Spain between September 2020 and May 2022.

2.2 Participants

Our study population consisted of patients diagnosed with organ-confined prostate cancer who underwent a radical prostatectomy as treatment between January and June 2019. For this purpose, the sample was taken using consecutive patient selection. The final sample consisted of 51 patients.

The inclusion criteria for patient selection were: (a) A diagnosis of organ-confined prostate cancer. (b) Having undergone surgical treatment by means of a radical prostatectomy between January and June 2019 in the hospital where the study was carried out. (c) Having undergone a pre-surgical biopsy and having the anatomopathological study of the surgical specimen available. The exclusion criteria were: (a) A pre-surgical diagnostic biopsy not performed in the Urology Department of the Morales Meseguer Hospital. (b) Impossibility to access clinical history or other data to be studied.

2.3 Data collection

Data collection was carried out between November 2020 and January 2021. A protocol and collection plan were designed based on previous studies related to the research topic [41].

The list of prostate biopsies performed by the Anatomical Pathology department was requested. Requests for complementary tests from all patients were reviewed to select those that met the selection criteria. Subsequently, the rest of the requests and test reports were studied to ensure that all participants presented information on the variables being studied.

The protocol for data collection was developed, with the aim of maintaining the reliability of the information for each of the variables across the patients. The information was obtained from medical records, biopsy reports from Anatomical Pathology, reports of first and follow-up consultations, imaging test reports and pre-anaesthesia reports. However, priority was given to collecting data from primary documents such as analytical reports and reports of other complementary tests. The use of clinical consultation reports was avoided for this purpose.

2.4 Study variables

In order to analyze the variables appropriately, they were collected and categorised into (A) Sociodemographic: age and body mass index (BMI). The variable age was grouped into young adult (under 65 years) and older adult (65 years and over). BMI was also grouped into normal weight and overweight/obese. (B) Pre-surgical quality of life tests: International Consultation on Incontinence Questionnaire (ICIQ) test, International Prostate Symptom Score (IPSS) test, International Index of Erectile Function (IIEF) test. (C) Pre-surgical clinics: biochemical, physical examination, prostate volume by transrectal ultrasound, image-guided transrectal biopsy report, Gleason score and clinical staging. (D) Post-surgical quality of life: consultation for erectile dysfunction. (E) Post-surgical clinics: biopsy report of the surgical specimen, surgical specimen volume, regional or distant extension, Gleason score and clinical staging. The Gleason score was grouped according to non-aggressive (total score of 6 or 7) and aggressive (8 or higher) histology.

2.5 Data analysis

Descriptive statistics were used for data analysis. Version 26 of SPSS statistical software (IBM Corporation, New York, NY, USA) was used for the calculations. Quantitative variables were analyzed using measures of central tendency and dispersion (mean, standard deviation (SD), median and range). Qualitative variables were analyzed using a study of frequencies and percentages. Prior to the analysis of correlation and comparison between groups, the distribution of the variables was studied using the Kolmogorov-Smirnov test. The only variables that followed a pattern of normality according to the Kolmogorov-Smirnov test with $p \geq 0.05$ were age and BMI. Therefore, Pearson's correlation coefficient was used for correlation analysis. For comparison between groups of qualitative variables, the chi-squared test or Fisher's exact test was used. The Mann-Whitney U test was used to compare the medians of 2 independent groups and the Kruskal-Wallis test was used to compare the medians of more than 2 independent groups. Differences between groups with a p-value of less than 0.05 were considered significant.

3. Results

3.1 Descriptive statistics

The total sample comprised 51 participants (n = 51). Age followed a normal distribution according to the Kolmogorov-Smirnov test with $p = 0.055$. The mean age of the patients was 64.29 years (range = 54–78 years; SD = 6.06). The mean BMI was 29.10 (range = 21.76–31.87; SD = 4.45). Among the quality-of-life variables, 58.82% of patients (n = 30) had no or mild prostatic symptoms, while 41.18% (n = 21) had prostatitis. 88.2 % (n = 45) were urinary continent, with the remainder (n = 6) presenting urinary incontinence. Erectile dysfunction was present in 66.6% of participants (n = 34). The mean transrectal prostatic ultrasound volume was 34.92 cc (range = 17–57; SD = 3.01) and the mean surgical specimen volume was 46.81 cc (range = 32–62; SD = 8.20). The most common Gleason score was 7. The most common clinical staging was T1c in 54.90% (n = 28) while the pathological staging was T2 in 62.54% (n = 32).

3.2 Association and correlation analysis

The correlation between the variables can be found in **Supplementary Table 1**.

3.2.1 Sociodemographic *vs.* clinical variables

The correlation between age and prostate volume obtained by transrectal ultrasound was statistically significant (r = 0.279, $p = 0.048$) in the whole sample, while the correlation of prostate volume in the surgical specimen was only statistically significant in patients older than 65 years (r = 0.401, $p = 0.038$), as can be seen in **Supplementary Table 1**.

BMI correlated positively with prostate volume (r = −0.404, $p = 0.003$). Patients with a BMI greater than 30 had a more increased prostate volume than those who were within the healthy weight range and were overweight.

In addition, BMI correlated closely with tumour aggressiveness (r = 0.410, $p = 0.003$). In patients with histologically aggressive tumours (Gleason score greater than or equal to 8) a strong correlation was found (r = 0.873, $p = 0.005$).

3.2.2 Quality-of-life *vs.* clinical variables

The ICIQ test for urinary incontinence was statistically significant in its association with the degree of prostatism (r = 0.456, $p = 0.001$), the post-surgical Gleason score (r = 0.463, $p = 0.001$) and consultation for erectile dysfunction (r = −0.343, $p = 0.014$). The IPSS test for prostatism was associated with urinary incontinence, Gleason (r = 0.314, $p = 0.025$) and consultation for erectile dysfunction (r = −0.301, $p = 0.032$). From this it can be deduced that the higher the degree of prostatism and urinary incontinence, the greater the tumour aggressiveness and the lower the frequency of post-surgical consultation for erectile dysfunction.

For the IIEF erectile dysfunction test, an association with age was found (r = −0.320, $p = 0.044$). Erectile dysfunction consultation was inversely associated with age (r = −0.385, $p = 0.005$), UI (r = −0.343, $p = 0.014$), prostatism (r = −0.301, $p = 0.032$) and Gleason (r = −0.501, $p = 0.0001$). Therefore, older patients with poorer quality of life from a genitourinary point of view sought consultation for erectile dysfunction less often. Similarly, greater tumour aggressiveness led to fewer erectile dysfunction consultations.

3.2.3 Clinical *vs.* clinical variables

A moderate correlation was found between prostate volume measured by transrectal ultrasound and that of the surgical specimen (r = 0.639, $p = 0.0001$), although there is no statistical significance when analyzed according to groups categorized by size.

Tumour aggressiveness according to the Gleason score of the transrectal biopsy showed a good association with that of the surgical specimen (r = 0.800, $p = 0.0001$). In addition, higher tumour aggressiveness correlated with higher clinical (r = 0.374, $p = 0.007$) and pathological (r = 0.460, $p = 0.001$) staging.

A significant positive correlation was observed between clinical and pathological staging (r = 0.314, $p = 0.025$).

3.3 Comparison of the groups

3.3.1 Sociodemographic *vs.* clinical variables

The inter-group analysis of those with correlation can be found in Table 1.

When comparing prostate volume of the surgical specimen in young adults (under 65 years, n = 24) and older adults (65 years or older, n = 27) no statistically significant differences were found (mean range = 23.23 *vs.* mean range = 28.46; w = 257.5; $p = 0.209$).

Significant differences were found in the presence of erectile dysfunction depending on age (f = 10.594, $p = 0.09$). Young adult patients obtained a mean IIEF erectile dysfunction test score of 19.42 ± 4.07 while older adult patients obtained a mean IIEF score of 15.85 ± 6.40. Therefore, older patients had more dysfunction.

Furthermore, statistically significant differences ($x^2 = 6.996$, $p = 0.012$) were observed in terms of consultation for erectile dysfunction in younger and older adults. Young adults

TABLE 1. Intergroup analysis.

Variables	Statistical test	Sociodemographic *vs.* Clinical	Statistical significance	*p* value
Age	<65 yr	≥65 yr		
Average range	n = 24	n = 27		
Vol	23.23	28.46		0.209
GS	24.46	28.46		0.160
DE	-	-	f = 10.594	0.090
Cons ED	-	-	x^2 = 6.996	0.012*
BMI	Healthy weight	Overweight/obese		
Average range	n = 24	n = 27		
Vol	22.91	36.04	w = 113.500	0.006*
GS	19.13	28.12	w = 151.500	0.019*
Staging	-	-	f = 6.810	0.078
		Quality of life *vs.* Clinical		
UI	No	Yes		
Average range	n = 45	n = 6		
BMI	25.250	31.580		0.339
Prostatism	23.580	44.170	w = 26.000	<0.001*
Cons ED	20.310	25.510	w = 63.000	0.020*
Prostatism	No	Yes		
Average range	n = 32	n = 19		
BMI	-	-		0.303
GS	-	-		0.140
Cons ED	-	-		0.146
Erectile dysfunction	No	Yes		
GS Average range	20.020	31.310	w = 180.500	0.001*
Consultation for ED	No	Yes		
Average range	n = 27	n = 240		
Age	-	-	f = 6.996	0.012*
GS	20.020	31.310	w = 180.500	0.001*
		Clincical *vs.* Clinical		
GS	<8, not aggressive	≥8, agressive		
Average range	n = 43	n = 8		
PSA	26.130	25.310		0.887
SS upv				
Ultra vol	-	-	f = 10.324	0.004*
GS Sx				
GS bx	-	-	f = 23.330	<0.001*
PS				
CS	-	-	f = 13.395	0.239

**Correlation is significant at 0.05 (bilateral). Vol: volume; GS: Gleason score; DE: erectile dysfunction; Cons ED: consultation for ED; UI: urinary incontinence; PSA: prostate specific antigen; Ultra vol: transectal ultrasound prostate volume; SS upv: surgical specimen ultrasound prostate volume; BMI: body mass index; Bx: biopsy; Sx: surgery; CS: clinical stage; PS: pathological stage.*

TABLE 2. Measures of central tendency of BMI by tumour aggressiveness.

Variables	Gleason score	
BMI	Not aggressive (n = 43)	Agressive (n = 8)
Range	21.76–38.87	26.98–36.11
Average and ED	28.5953 ± 4.40524	31.8375 ± 3.92159

BMI: body mass index; ED: consultation for erectile dysfunction.

sought consultation for this reason in 67% of cases compared to 30% of older adults.

Statistically significant differences in prostate volume (w = 113.5, $p = 0.006$) were observed between patients with normal weight (n = 24; mean range = 22.91) and those overweight or obese (n = 27; mean range = 36.04).

Significant differences were found between the Gleason score of healthy weight and overweight/obese patients (mean range = 19.13 and 28.12, respectively; w = 151.5, $p = 0.019$). The mean BMI in non-aggressive Gleason patients was 28.59 ± 4.40 while in aggressive Gleason patients it was 31.84 ± 3.92, as can be seen in Table 2.

Furthermore, within the group of healthy weight patients, no patients with aggressive Gleason scores were found compared to the 8 found in overweight or obese patients. Healthy weight patients obtained a mean Gleason score of 6.75 ± 0.45, overweight patients 7.11 ± 5.83, and obese patients 7.38 ± 0.80.

After analyzing BMI and pathological staging, no significant differences were found (f = 6.810, $p = 0.078$).

3.3.2 Quality-of-life *vs.* clinical variables

When analyzing BMI according to whether or not UI was present, no significant differences were found (mean range = 25.25 *vs.* 31.58; $p = 0.339$). However, statistically significant differences were found when compared with the presence of prostatism, which was measured by IPSS questionnaire (mean range = 23.58 *vs.* 44.17; w = 26.000, $p = 0.0001$). Similarly, there were also significant differences (w = 63.000, $p = 0.024$) when comparing whether or not they sought consultation for erectile dysfunction.

Patients without prostatism or mild prostatism according to the IPSS score had a mean BMI of 28.43 ± 4.42, a mean Gleason score of 6.97 ± 0.414. Of these, 60% sought consultation for erectile dysfunction. Amongst the men with moderate or severe prostatism, a BMI of 28.43 ± 4.42 and a Gleason score of 7.38 ± 0.92 were obtained. Only 29% later sought consultation for erectile dysfunction.

Significant differences were found in the age of consultants and non-consultants for erectile dysfunction (f = 6.996, $p = 0.012$). Differences were also found in the Gleason score (consultants with mean Gleason rank = 20.02 *vs.* non-consultants 31.31; w = 180.5, $p = 0.001$).

The mean age of patients who sought consultation for erectile dysfunction was 61.83 ± 5.32 and had a Gleason of 6.79 ± 0.415. Those who did not seek consultation had an age of 66.48 ± 6.00 and Gleason 7.44 ± 0.75.

3.3.3 Clinical *vs.* clinical variables

Statistically significant differences were found between pre-operative and operative transrectal ultrasound prostate volume (f = 10.324, $p = 0.004$). Pre-surgical prostate volume was obtained by transrectal ultrasound. Prostate volume was underestimated by ultrasound in 52.94% of cases, predominantly in smaller volumes.

Significant differences were obtained between the Gleason score obtained from the biopsy and that from the surgical specimen (f = 23.330, $p < 0.001$). Tumour aggressiveness was underestimated in 41.18% (n = 21) of cases. This did not occur with aggressive Gleason scores and was more significant with Gleason scores of 6 than with 7 (77.3% *vs.* 16% respectively).

No significant differences were observed when comparing clinical and pathological staging (f = 13.395, $p = 0.239$).

Patients classified as T1c in the clinical staging did not match the pathological staging in any case, since it is not categorised as such. However, taking this into account, we will include them in stage T2a. Thus, they coincided in 32.14% (n = 9) and were underestimated in 67.86% (n = 19). The T2a matched in 12.5% of cases (n = 1) and T2b in 38.5% (n = 5). No patients were clinically staged as T2c. Of the total T2, staging was overestimated in 1 patient and underestimated in 69.57% (n = 16). No patients were clinically staged as T3. Therefore, staging was underestimated in 64.71% (n = 32) of all cases.

4. Discussion

Several authors highlight the impact of prostate surgery on quality of life [42, 43]. It is therefore becoming more common to opt for an initial conservative treatment after being diagnosed with the disease [44]. Delaying or avoiding surgical treatment, together with active surveillance measures, may improve quality of life [45] and thus be an alternative to a radical prostatectomy. However, some authors question the effectiveness of this active surveillance practice in relation to survival [46].

The diagnostic algorithm of a PCa patient is based on physical examination, imaging tests and pathology. For years, tools have been sought to predict pathological staging at diagnosis [41]. The usefulness of PSA and the Gleason score has been widely validated as pre-treatment prognostic markers [19]. In addition to these factors, other authors have highlighted how positive surgical margins after RP are in predicting the risk of biochemical recurrence and estimate oncological targets [47]. Although clinical staging has been found to be a good independent estimator of disease progression, there is a tendency to underestimate the final pathological stage at diagnosis [41]. This is consistent with our data, where this occurs in up to 75%

of cases.

Digital rectal examinations are among the diagnostic modalities for the detection of PCa. However, they are currently in disuse according to Borkenhagen *et al*. [48]. For Yamamoto *et al*. [49] it is a useful tool in the estimation of prostate volume, although Boesen [17] indicates that it has a number of limitations. This author highlights the limitation of digital rectal examinations given that most tumours are not palpable until they reach a certain size. Among our participants, only 37.5% had a concerning digital rectal examination at diagnosis. This contrasts with the 55% of cases diagnosed by digital rectal examination described in another study [18]. Although these figures are not very encouraging to support its use as a screening method, Okotie *et al*. [50] highlights that it is a tool that diagnoses up to 18% of PCa with normal PSA levels. It should also be noted that RT remains an indispensable tool in the diagnosis of PCa as undifferentiated tumours may tend not to raise PSA levels. Therefore, basing the diagnosis of suspected PCa on PSA alone can be misleading. In addition, in the case of benign prostatic hyperplasia, size assessment can guide the selection of different treatments among those currently available.

Significant differences were found between the Gleason score obtained from the biopsy and that from the surgical specimen. Tumour aggressiveness was underestimated in over 40% of cases. The less aggressive the tumour appeared on a transrectal biopsy, the more it was underestimated. To improve the use of the Gleason score, Heidegger *et al*. [51] recommend the International Society of Urological Pathology (ISUP) modified Gleason score as a marker that may be beneficial in risk estimation. However, for Novak *et al*. [52], the preoperative usefulness of the ISUP in predicting pathological features of the RP sample is controversial, as observed in our results. According to Ikeda *et al*. [53], the Gleason score is an independent prognostic tool, so an adequate interpretation and estimation of the final Gleason score is crucial when managing patients with PCa.

When measuring prostate volume, the sensitivity and specificity of ultrasound-guided biopsy has been described as low/moderate, as there is a significant probability of not biopsying the tumour area or not picking up the most aggressive areas of the tumour [54]. This is consistent with the results of our study in terms of prostate volume, as there was a significant difference between the volume of the ultrasound image and the final volume of the surgical specimen. However, other studies have found that it is possible to stratify prostate volume with high accuracy by digital rectal examination into >30 mL and <30 mL groups [49]. Therefore, since the gold standard for the diagnosis of this pathology includes an anatomopathological study, the use of MRI is being implemented to guide the biopsy [55], which improves anatomical determinations, lesion characterization and the use of biopsies in appropriate areas.

Being overweight or obese was related to greater tumour aggressiveness according to the Gleason score. There are significant differences in Gleason scores between healthy weight and overweight or obese patients [56]. This is consistent with our results, which demonstrate that patients with higher aggressiveness on the Gleason score have a BMI 3.39 higher than participants with lower aggressiveness on the Gleason score. However, as our study is not designed to identify causal factors, we cannot make any conclusions of our own in this regard. This has also been supported by other authors, in that obesity has been associated with advanced PCa with stage T3 or Gleason ≥ 7 [57]. Given our study's design and sample size, causal inference is not possible. The pathophysiological mechanism that demonstrates how obesity plays a role in the aggressiveness of the disease, has been explained by adipocyte-generated mediators [58].

Patients with greater tumour aggressiveness were less concerned with the sexual aspects of the disease and focused their attention on the purely clinical side. This could be explained by how the disease process is involved in the different spheres of quality of life [59, 60]. Taking the clinical diagnosis as a reference for therapeutic decision-making can lead to a reduction in quality of life [21]. RP can lead to the appearance of sexual dysfunction [61, 62], urinary incontinence or anastomotic stenosis [63]. However, the appearance of sexual dysfunction will also depend on the baseline situation of the patient [64]. Although previous evidence suggests that age is related to a higher occurrence of erectile dysfunction [23], our results suggest that a lower percentage of older adults seek medical consultation for this reason. Changes in the sexual sphere are a key concern for patients undergoing RP [21]. In addition to these organic adverse effects, other psychological and emotional chages related to the disease have been described [33]. The social, family and partner context also has a considerable impact on patients undergoing RP [37]. Despite this, measures taken by the health and social care systems are generally focused solely on the patient and not so much on those at their side [23].

The main limitation of the present study is the sample size. Difficulties were encountered in data collection due to the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-Cov2) pandemic. Access to the hospital for research purposes was limited at the time the data collection was planned to take place, as priority was given to entry for clinical purposes. Given the sample size and the retrospective, cohort design of the study, it is difficult to draw conclusions that can be extrapolated to the general population. In the hospital where the data were collected, the IIEF questionnaire was administered only once prior to surgery. In order to overcome this limitation, clinical histories were reviewed in order to compile information on whether the patients had sought consultation for erectile dysfunction.

5. Conclusions

Pre-surgical clinical staging determines the decision of how to treat prostate cancer. A radical prostatectomy may have implications for quality of life. Therefore, knowing if there is a correlation between clinical and pathological staging is considered necessary to provide individualized treatment. Our results suggest that older age could be related to increased erectile dysfunction, that obesity could be related to more aggressive prostate cancer, and that there can be differences in the Gleason score between the biopsy and the final specimen. No differences were found between clinical and pathological

staging. However, we should consider whether their correlation is sufficiently robust for clinical staging to be used for both therapeutic management of the patient and for joint decision-making. These findings suggest that the Gleason score results should be interpreted cautiously.

Future research with a larger sample size is required to corroborate whether the Gleason score and the pre-surgical clinical stage concurs with post-surgical information. Further research about the influence of body mass index on the pathogenesis of prostate cancer should be addressed. Both elements need to be taken into account when making decisions about the therapeutic management of PCa. Moreover, research on the influence of prognosis on the psycho-emotional state of the patient and their environment would be desirable.

ABBREVIATIONS

PCa, Prostate Cancer; RP, Radical Prostatectomy; MSD, Male Sexual Dysfunction.

AVAILABILITY OF DATA AND MATERIALS

The data presented in this study are available on reasonable request from the corresponding author.

AUTHOR CONTRIBUTIONS

TFA, ÁMB, CFS and JMHP—designed the research study. ÁMB, APPM, GGH and TFA—performed the research. CFS, APPM, IDS and GGH—provided help and advice on critical review of the manuscript. ÁMB, JMHP, IDS and TFA—analyzed the data. JMHP and ÁMB—wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the "Comisión de Evaluación de Trabajos de Investigación" (Research Works Evaluation Commission) of the Hospital General Universitario Morales Meseguer, Murcia, Spain with code CETI: 13/21. The patients provided informed consent and agreed to publication of the details of this research.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at https://oss.jomh.org/files/article/1685891518229823488/attachment/Supplementary%20material.docx.

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