INTRODUCTION
Prostate cancer is one of the more commonly diagnosed cancers worldwide and one of the leading causes of cancer death among men. The majority of prostate cancers are clinically localized (i.e., cT<3a, cN0, and cM0) at the time of diagnosis. Therefore, the aim of any primary treatment is to maximize survival while preserving quality of life (QoL). However, substantial sexual, urinary, and bowel morbidities have been identified after treatment, with the pattern and severity of morbidity varying according to the type and intensity of treatment received. In fact, the adverse effects of the primary treatments can negatively affect QoL. Sexual function is also considered important in its own right. Patient-reported outcomes have been increasingly recognized as a critical cancer-treatment outcome measure. This is especially true for patients with prostate cancer, as they often have extended life expectancy. The consequences of treatments such as robotic prostatectomy or intensity-modulated radiotherapy on quality-of-life effects have become a central consideration for many men in their decision-making process.

We recently reported a prospective, multicenter cohort study (AndroCan, NCT02235142) involving men with localized prostate cancer who underwent robotic radical prostatectomy. In this cohort, we assessed the levels of circulating androgens at baseline, immediately before surgery, and we observed that testosterone deficiency was independently associated with higher prostate cancer aggressiveness. At the same time (i.e., baseline), patients were asked to complete QoL and erectile dysfunction (ED) questionnaires. We used the database from the AndroCan project to correlate the scores of the auto-questionnaires on QoL and ED status with demographic, clinical, and biological (including androgen levels) characteristics.

PATIENTS AND METHODS
Study population
The AndroCan trial is a multicenter, prospective, longitudinal cohort study on consecutive newly diagnosed prostate cancer patients scheduled for robot-assisted radical prostatectomy. Provisions...
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Table 1

| Trait                                      | Values       |
|--------------------------------------------|--------------|
| Waist circumference                        | ≥102 cm      |
| Triglyceride level                         | >150 mg dL⁻¹ |
| Cholesterol level                          | <40 mg dL⁻¹  |
| Blood pressure                             | ≥130 mmHg    |
| Blood sugar                                | ≥100 mg dL⁻¹ |
| Hypoglycemia                               | ≥80 mmHg     |
| Hypercholesterolemia                       | ≥200 mmHg    |
| Erythrocyte count                          | ≥4.5 millions |
| Hemoglobin                                 | ≥13 g dL⁻¹   |
| Lactate                                    | ≤2 mmol L⁻¹  |
| Glucose                                    | ≤100 mg dL⁻¹ |
| Creatinine                                 | ≤1.5 mg dL⁻¹ |
| Protein                                    | ≥75 g dL⁻¹   |
| Urine specific gravity                     | ≥70 mg dL⁻¹  |
| Hematuria                                  | ≤5 RBC_PORTS|
| Sedimentation                              | ≤25 RBC_PORTS|
| Hemoglobinuria                             | ≤3 mmol L⁻¹  |
| Erythrocyte count                          | ≥4.5 millions |
| Hemoglobin                                 | ≥13 g dL⁻¹   |
| Lactate                                    | ≤2 mmol L⁻¹  |
| Glucose                                    | ≤100 mg dL⁻¹ |
| Creatinine                                 | ≤1.5 mg dL⁻¹ |
| Protein                                    | ≥75 g dL⁻¹   |
| Urine specific gravity                     | ≥70 mg dL⁻¹  |
| Hematuria                                  | ≤5 RBC_PORTS|
| Sedimentation                              | ≤25 RBC_PORTS|
| Hemoglobinuria                             | ≤3 mmol L⁻¹  |

RESULTS

Population cohort study

Of the 1343 patients included in the AndroCan study, 146 (10.9%) declined to participate; thus, of the 1197 providing answers, 178 (14.9%) gave answers that were not suitable for analysis. Thus, 1019 cases (85.1% of those answering, 75.9% of the total cohort) gave scores that were analyzed. Their mean age was 63.6 (range: 40.5–78.1) years; one patient out of six reported clinical characteristics or biological...
values that were consistent with a diagnosis of metabolic syndrome. Fourteen percent of cases was considered hypogonadal, on the basis of bioavailable testosterone (<0.8 ng ml\(^{-1}\)) and slightly less (11.7%) from total testosterone (<3.0 ng ml\(^{-1}\)). When merging the two sets, 22.9% of patients were considered hypogonadal (Table 1).

**Erectile function**

**Associations with dichotomous parameters at baseline**

Comparison between levels of dichotomous parameter for IIEF-5 global scores showed significant differences for Caucasians, obese patients, patients with large waist circumference, patients presenting metabolic syndrome, diabetic patients, patients with cardiovascular disorders, patients with arterial hypertension, patients with higher blood sugar, patients taking concomitant medications, patients with lower bioavailable testosterone, and patients with hypogonadism.

**Correlations with baseline quantitative parameters**

Baseline age, weight, fat mass percentage, FSH, LH, and prostate volume were significantly and positively correlated with the baseline IIEF-5 global score, except for age that explains about 8% of the variance of the IIEF-5 score; the other correlation explains at most 2% of this variance. Baseline total cholesterol, DHEA, D5, and DHEA sulfate were significantly and negatively correlated to the baseline IIEF-5 global score. However, none of these correlations explained more than 2% of the variance of the latter (Table 2).

**Multivariate models**

The model for the ED score was calculated on 946 cases and explains 14.5% of the variance. It comprises seven significant independent predictors: fat mass percentage, age (highest relative contributor), D4, DHEA sulfate, and presence of cardiovascular disease independently increased (worsened) the IIEF-5 score, whereas DHEA (highest relative contributor) and absence of any concomitant medication decreased (improved) the score (Table 2).

**Aging male symptoms**

**Associations with dichotomous parameters at baseline**

The AMS global score was significantly higher in patients with larger waist circumference (and somatic and sexual subscales), patients with a metabolic syndrome (and for the 3 subscales), patients with somatic disorders: diabetes, cardiovascular disorders, or high blood pressure (and the psychological and sexual subscales for the latter), patients with lower HDL cholesterol or with higher blood sugar (also for the 3 subscales), and patients taking concomitant medication (also for the 3 subscales). Patients with lower bioavailable testosterone and hypogonadal patients had significantly higher sexual subscale scores (Table 1).

**Correlations with baseline quantitative parameters**

Baseline weight and fat mass proportion were positively correlated with the global AMS score. DHEA, D5, and DHEA sulfate were significantly but negatively correlated with the AMS global score (Table 2).

**Multivariate models**

The model for the global AMS score was obtained on 926 patients but explained only 3.3% of the variance. It was based on two significant independent predictors that have a similar but opposite impact on the score: waist circumference, which increases the score; and absence of any concomitant medication, which decreases the score (Table 4).

**DISCUSSION**

In the present study, we obtained results on baseline QoL and ED status in a cohort of more than one thousand men with a localized prostate cancer requiring robot-assisted surgery. In particular, we were able to investigate the relationship of ED and QoL, assessed by standard questionnaires, with circulating testosterone, and its precursors and metabolites, assessed according to recommendations of the International Society of Endocrinology.

First, the observations of ED and QoL fared rather differently. On the one hand, ED was found to be negatively affected in some ways by age, florid complex (overweight, large fat mass percentage), and clinical features (diabetes, hypertension, and other cardiovascular disease). On the other hand, QoL was affected to a lesser degree, with a metabolic syndrome and high blood pressure being its most obvious correlate. Hence, we were not able to show a clear association between total testosterone and QoL/ED. However, low levels of bioavailable testosterone and combined low levels of both total and bioavailable testosterone were associated with some impairment of ED and QoL (AMS global score and sex subscore). FSH, LH, and SHBG were positively correlated with IIEF-5 and some AMS subscores, i.e., higher results were associated with worsening disease. On the contrary, higher levels of DHEA, D5, D4, and DHEA sulfate were negatively correlated with IIEF-5 and AMS; higher levels of these androgens seemed to improve ED and QoL.

Second, biopsy outcomes were conspicuously not associated to QoL/ED; thus, the mental burden on a patient of knowing that he has a malignant disease that requires surgery does not appear to play a major role in impairing QoL or erectile function. Since the prostate was resected in all patients and examined by a single pathologist, the role of cancer severity in impaired QoL or ED immediately before surgery could be assessed. Prostate volume was weakly correlated with a high level of ED, but neither ED nor QoL seemed to be associated with cancer aggressiveness.

Third, predicting QoL scores from baseline characteristics was mostly unsuccessful (the model explained 3% of the AMS variance); the best predictor was the lack of concomitant medication at the time of surgery, which is generally considered a surrogate marker of good health.\(^{15,16}\) On the contrary, a model that accounts for about 15% of the IIEF-5 score variance was obtained including demographic, clinical, and hormonal factors. This model confirms that testosterone assessments should also include some of its precursors or metabolites.

Some people may be surprised not to find any independent assessment of anxiety as it is frequently considered as a confounding factor in QoL studies. In fact, it is a deliberate approach in our multidisciplinary team, which considers that anxiety plays a vital function in alerting us to threats and to what we need to do to sustain a modern existence. We believe that people living with anxiety demonstrate how to cope and manage anxiety. Although anxiety remains a vital component of whom we are, it does not define what we are. Consequently, we are better equipped to assess properly the actual quality of our life.

Of course, adverse events associated with prostate cancer may explain some impairment of QoL, but significant events of this kind were extremely rare in our cohort of early-stage cancers that were
Table 1: Association of dichotomous variables levels for clinical characteristics with IIEF-5 and AMS

| Parameters (Group I vs Group II) | Participants (Group I vs Group II), n (%) | Scale | Group I vs Group II, mean (95% CI)* | Difference between Group I and Group II, mean (95% CI)* | P for difference |
|----------------------------------|------------------------------------------|-------|-----------------------------------|----------------------------------------------------------|---------------|
| Ethnicity (Caucasian vs non-Caucasian) | 877 (89.9) vs 98 (10.1) | IIEF-5 | 6.3 (6.0–6.7) vs 5.1 (4.2–6.0) | 1.2 (0.3–2.2) | 0.032 |
| Obesity (BMI ≤30 kg m⁻² vs BMI ≥30 kg m⁻²) | 850 (83.9) vs 163 (16.1) | IIEF-5 | 6.1 (5.7–6.4) vs 7.0 (6.7–7.8) | −0.9 (−1.8–0.005) | 0.030 |
| Waist circumference (<102 cm vs ≥102 cm) | 563 (60.8) vs 363 (39.2) | IIEF-5 | 5.8 (5.4–6.2) vs 6.6 (6.1–7.1) | −0.8 (−1.3–0.2) | 0.115 |
| Metabolic syndrome (no vs yes) | 849 (83.6) vs 167 (16.4) | IIEF-5 | 5.9 (5.6–6.3) vs 7.6 (6.9–8.5) | −1.8 (−2.7–0.9) | 0.0002 |
| Diabetes mellitus (reported by patient), no vs yes | 916 (90.8) vs 93 (9.2) | IIEF-5 | 6.1 (5.8–6.4) vs 7.4 (6.4–8.5) | −1.3 (−2.4–0.2) | 0.014 |
| Cardiovascular disorder (reported by patient), no vs yes | 933 (92.5) vs 76 (7.5) | IIEF-5 | 6.1 (5.8–6.4) vs 8.0 (8.8–9.2) | −1.9 (−3.2–0.7) | 0.001 |
| High blood pressure (reported by patient), no vs yes | 642 (63.8) vs 364 (36.2) | IIEF-5 | 6.0 (5.7–6.3) vs 7.1 (6.2–8.1) | −1.1 (−2.1–0.0) | 0.022 |
| HDL cholesterol (≥40 mg dl⁻¹ vs <40 mg dl⁻¹) | 580 (76.3) vs 180 (23.7) | IIEF-5 | 6.3 (5.9–6.7) vs 6.5 (5.8–7.2) | −0.1 (−0.9–0.7) | 0.77 |
| Triglycerides (<1.5 g l⁻¹ vs ≥1.5 g l⁻¹) | 459 (70.4) vs 209 (29.6) | IIEF-5 | 6.3 (5.8–6.8) vs 6.3 (5.6–7.0) | −0.1 (−0.80–0.80) | 0.56 |
| Blood sugar (≤1 g l⁻¹ vs >1 g l⁻¹) | 519 (66.7) vs 248 (33.3) | IIEF-5 | 6.0 (5.6–6.5) vs 7.1 (6.5–7.8) | −1.1 (−1.9–0.2) | 0.007 |
| Concomitant medication (at least one vs none) | 639 (85.3) vs 380 (14.7) | IIEF-5 | 6.9 (6.5–7.3) vs 5.1 (4.7–5.6) | 1.7 (1.1–2.3) | 0.0002 |

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mostly asymptomatic. It is not impossible but fairly unlikely that they caused major changes in QoL.

One may argue that the external validity of our results is uncertain for many reasons.

1. Patients who agreed to provide answers to questionnaires may differ from those who decided not to participate. To determine if this was the case, we compared patients who provided answers to those refusing to participate in this part of the study. Although a fifth center located in the French Antilles took part in the study. However, in this area, chlordecone, a pesticide, seems to prevent our results from being generalizable to the general population.

2. Aging males receive a large number of concomitant medications, which probably affect QoL/ED. This cannot be ruled out, although we excluded patients who took drugs known to have a hormonal impact. However, fine-tuned data are clearly lacking on the possible effects of various classes of medication on the level of sexual hormones, and it is therefore possible that such effects may have affected the general quality of life and erectile function independently of prostate cancer.

3. Most of our patients were whites recruited in metropolitan France. In fact, a fifth center located in the French Antilles took part in the study. However, in this area, chlordecone, a pesticide, seems to prevent our results from being generalizable to the general population.

4. Marital status, education, and income have not been recorded in our database, as it was primarily aimed at predicting cancer aggressiveness from physical, clinical, biological, hormonal, and comorbidity parameters. Despite the large sample size, which probably prevents our figures from being compared to those of the general French population, our conclusions...
Table 2: Univariate correlations between auto-questionnaires results and demographic, clinical, and hormonal parameters

| Parameter            | Patients (n) | IIEF-5 (P)     | AMS somatic (P) | AMS psychological (P) | AMS sexual (P) | AMS global (P) |
|----------------------|--------------|----------------|-----------------|-----------------------|----------------|----------------|
| Age (year)           | 1012         | 0.28 (<0.0001) | 0.01 (0.78)     | −0.04 (0.20)          | 0.20 (<0.0001) | 0.06 (0.08)    |
| Height (cm)          | 1011         | −0.02 (0.46)   | 0.07 (0.17)     | 0.04 (0.23)           | −0.02 (0.56)   | 0.05 (0.13)    |
| Weight (kg)          | 1015         | 0.07 (0.31)    | 0.10 (0.002)    | 0.05 (0.09)           | 0.02 (0.48)    | 0.07 (0.017)   |
| Fat mass (%)         | 972          | 0.14 (<0.0001) | 0.05 (0.14)     | 0.05 (0.14)           | 0.08 (0.010)   | 0.06 (0.044)   |
| Gleason score (biopsy) | 1012      | 0.04 (0.19)    | 0.02 (0.59)     | 0.04 (0.25)           | 0.06 (0.052)   | 0.04 (0.19)    |
| PSA (ng ml⁻¹)        | 1006         | 0.03 (0.40)    | −0.02 (0.46)    | 0.02 (0.59)           | 0.03 (0.28)    | 0.01 (0.84)    |
| Total cholesterol (ng dl⁻¹) | 765    | −0.08 (0.032)  | −0.07 (0.040)   | −0.02 (0.56)          | −0.06 (0.11)   | −0.07 (0.06)   |
| FSH (mU ml⁻¹)        | 1018         | 0.10 (0.001)   | 0.02 (0.47)     | −0.01 (0.77)          | 0.09 (0.004)   | 0.04 (0.18)    |
| LH (mU ml⁻¹)         | 1018         | 0.08 (0.016)   | −0.003 (0.93)   | 0.05 (0.16)           | 0.04 (0.24)    | 0.01 (0.70)    |
| SHBG (μg ml⁻¹)       | 1017         | 0.05 (0.10)    | −0.02 (0.54)    | 0.01 (0.82)           | 0.08 (0.012)   | 0.02 (0.59)    |
| DHT (ng ml⁻¹)        | 1016         | −0.05 (0.09)   | −0.04 (0.18)    | −0.02 (0.50)          | −0.04 (0.22)   | −0.04 (0.19)   |
| DHEA (μg dl⁻¹)       | NA           | −0.15 (<0.0001)| −0.05 (0.11)    | −0.02 (0.48)          | −0.12 (0.0001) | −0.08 (0.009)  |
| D5 (ng dl⁻¹)         | 1017         | −0.14 (<0.0001)| −0.05 (0.11)    | −0.02 (0.15)          | −0.10 (0.001)  | −0.08 (0.012)  |
| D4 (ng dl⁻¹)         | 1016         | −0.06 (0.07)   | 0.01 (0.72)     | 0.02 (0.61)           | −0.07 (0.022)  | 0.02 (0.53)    |
| E1 (pg ml⁻¹)         | 1015         | 0.03 (0.29)    | 0.02 (0.62)     | −0.03 (0.32)          | 0.02 (0.45)    | 0.005 (0.88)   |
| E2 (pg ml⁻¹)         | 1018         | 0.01 (0.63)    | 0.03 (0.30)     | −0.02 (0.43)          | 0.002 (0.95)   | 0.01 (0.81)    |
| DHEA sulfate (μg dl⁻¹) | 1016      | −0.07 (0.030)  | −0.09 (0.003)   | −0.02 (0.52)          | −0.07 (0.018)  | −0.08 (0.009)  |
| Prostate volume (g)  | 1003         | 0.06 (0.040)   | −0.01 (0.72)    | −0.03 (0.28)          | 0.004 (0.19)   | 0.002 (0.95)   |

AMS: Aging Male Symptom; D4: androstenedione; D5: androsteronol; DHEA: dehydroepiandrosterone; DHT: dihydrotestosterone; E1: estrogen; E2: estradiol; FSH: folliculostimulating hormone; IIEF-5: the International Index of Erectile Function 5-item; LH: luteinizing hormone; PSA: prostate-specific antigen; SHBG: sex hormone-binding globulin; NA: not available

Table 3: Multiple regression model for the International Index of Erectile Function 5-item

| Independent variable | Regression coefficient, β (i) | s.e., Sb(β(i)) | Standardized coefficient | Statistic t-test, H0: β(i)=0 | Probability level |
|----------------------|--------------------------------|----------------|--------------------------|-------------------------------|------------------|
| Intercept            | −10.142                        | 1.9140         | 0.128                    | −5.30                         | 0.0000           |
| Fat mass percentage  | 0.0914                         | 0.02178        | 0.128                    | 4.20                          | 0.0000           |
| Age                  | 0.207                          | 0.02566        | 0.267                    | 8.05                          | 0.0000           |
| DHEA                 | −0.506                         | 0.1281         | −0.185                   | −3.95                         | 0.0001           |
| D4                   | 1.352                          | 0.4484         | 0.116                    | 3.02                          | 0.0026           |
| DHEA sulfate         | 0.00851                        | 0.003083       | 0.104                    | 2.76                          | 0.0059           |
| Presence of cardiovascular disorder (yes) | 1.313 | 0.5622 | 0.0720 | 2.34 | 0.0198 |
| No concomitant medication (yes) | −0.998 | 0.3045358 | −0.103 | −3.277 | 0.0011 |

IIEF-5 score = −10.142 + 0.0914 × fat mass percentage + 0.207 × age + 0.506 × DHEA + 1.352 × D4 + 0.00851 × DHEA sulfate + 1.313 × cardiovascular disease present (yes=1) − 0.998 × no concomitant medication (yes=1); IIEF-5: the International Index of Erectile Function 5-item; D4: androstenedione; DHEA: dehydroepiandrosterone; s.e.: standard error

Table 4: Multiple regression model for Aging Male Symptom global score

| Independent variable | Regression coefficient, β (i) | s.e., Sb(β(i)) | Standardized coefficient | Statistic t-test, H0: β(i)=0 | Probability level |
|----------------------|--------------------------------|----------------|--------------------------|-------------------------------|------------------|
| Intercept            | 6.238                          | 2.6880         | 0.0000                   | 2.32                          | 0.021            |
| Waist circumference  | 0.0851                         | 0.02623        | 0.106                    | 3.24                          | 0.001            |
| No concomitant medication (yes) | −2.393 | 0.5798 | −0.135 | −4.13 | 0.0000 |

Global AMS score = 6.238 + 0.0851 × waist circumference − 2.393 × no concomitant medication (yes=1); AMS: Aging Male Symptom; s.e.: standard error

on QoL and ED should be used with caution as they may not hold if our cohort is biased toward one of these societal parameters.

CONCLUSIONS

In this cohort of men with localized prostate cancer, general QoL and erectile function (before surgery) were significantly affected by some baseline clinical/demographic characteristics. Total testosterone had a very limited impact of these outcomes, unlike bioavailable testosterone, the low levels of which negatively affected sexual functioning. In addition, testosterone precursors and metabolites also showed differential effects on erectile function. These findings may be used to inform patients with newly diagnosed prostate cancer. Further study of the influence of concomitant medications on QoL/ED would be desirable.

AUTHOR CONTRIBUTIONS

YN established the study design, drafted the manuscript, and helped with data acquisition. JFD drafted the manuscript and performed statistics. JPR helped to establish the study design and reviewed the manuscript. MR drafted the manuscript and helped with data acquisition. MS, MR, SD, MG, XC, and TL helped with data acquisition and reviewed the manuscript. HB established the study design and helped with drafting the manuscript. All authors read and approved the final manuscript.

COMPETING INTERESTS

All authors declare no competing interests.
REFERENCES
1 Siegel RL, Miller KD, Jemal A. Cancer statistics, 2020. CA Cancer J Clin 2020; 70: 7–30.
2 Barocas DA, Alvarez J, Resnick MJ, Kayama T, Hoffman KE, et al. Association between radiation therapy, surgery, or observation for localized prostate cancer and patient-reported outcomes after 3 years. JAMA 2017; 317: 1126–40.
3 Chen RC, Basak R, Meyer AM, Kuo TM, Carpenter WR, et al. Association between choice of radical prostatectomy, external beam radiotherapy, brachytherapy, or active surveillance and patient-reported quality of life among men with localized prostate cancer. JAMA 2017; 317: 1141–50.
4 Donovan JL, Hamdy FC, Lane JA, Mason M, Metcalfe C, et al. Patient-reported outcomes after monitoring, surgery, or radiotherapy for prostate cancer. N Engl J Med 2016; 375: 1425–37.
5 Lardas M, Liew M, van den Bergh RC, De Santis M, Bellmunt J, et al. Quality of life after primary treatment for clinically localised prostate cancer: a systematic review. Eur Urol 2017; 72: 869–85.
6 Nolte S, Liegl G, Petersen MA, Aaronson NK, Costantini A, et al. General population normative data for the EORTC QLQ-C30 health-related quality of life questionnaire based on 15,386 persons across 13 European countries, Canada and the United States. Eur J Cancer 2019; 107: 153–63.
7 Neuzillet Y, Raynaud JP, Dreyfus JF, Radulescu C, Rouanne M, et al. Aggressiveness of localized prostate cancer: the key value of testosterone deficiency evaluated by both total and bioavailable testosterone: AndroCan Study Results. Harm Cancer 2019; 10: 36–44.
8 Bhasin S, Cadeddu JA, Kirkby E, Chen RC, Crispino T, et al. Clinically localized prostate cancer: AUA/ASTRO/SUO guideline. Part II: recommended approaches and details of specific care options. J Urol 2018; 199: 990–7.
9 Rosen RC, Cappelleri JC, Smith MD, Lipsky J, Peña BM. Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. Int J Impot Res 1999; 11: 319–26.
10 Montgomery D, Peck E, Vining G. Introduction to Linear Regression Analysis. Oxford: Wiley Blackwell; 2012: p67-133.
11 Heimann LA, Saad F, Zimmermann T, Novak A, Myon E, et al. The Aging Males’ Symptoms (AMS) scale: update and compilation of international versions. Health Qual Life Outcomes 2003; 1: 15.
12 Heimann LA, Saad F, Zimmermann T, Novak A, Myon E, et al. The Aging Males’ Symptoms (AMS) scale: update and compilation of international versions. Health Qual Life Outcomes 2003; 1: 15.
13 Downey A, Wright P, Hounsome L, Selby P, Wilding S, et al. Quality of life in men living with advanced and localized prostate cancer in the UK: a population-based study. Lancet Oncol 2019; 20: 436–47.

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