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PSA request analysis: how should this be interpreted? What may be overlooked

PSA istem analizi: Nasıl yorumlanmalı? Gözden kaçanlar nelerdir?

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Abstract: Objective: Prostate specific antigen is widely used for the diagnosis, treatment, and follow-up of prostate cancer. However, despite being organ-specific, PSA is not specific to cancer. As some patients with elevated PSA level have normal biopsy results and some others with low PSA levels have cancer diagnosed in biopsy examination, PSA creates diagnostic uncertainty both for clinicians and patients. Moreover, different PSA results received for the same subject at separate time points as well as small-large fluctuations in PSA levels perturb both sides. In a setting where there are so many unknowns we have PSA in our hands without any restrictions for ordering it. This study analyzed PSA orders, patient traffic, and economic burden within a 6-year period.

Methods: The number of PSA tests and patient outcomes at a training and research hospital between October 2006 and May 2013 were evaluated.

Results: Of 12107 tPSA orders, 73.6% were ordered by the urology clinic and 26.4% orders were made from other outpatient clinics. When patients at follow-up for prostate cancer are excluded because their tPSAs have to be more commonly checked, we detected that 28.22% of tests were ordered at intervals of less than 1 year. The average tPSA testing frequency was 91.84±1.21 days (0–330). The number of patients younger than 40 years who were tested for tPSA was 287. Of these, 25.43% were ordered by the urology clinic and the remaining by other medical branches.

Conclusion: A state of chaos surrounds PSA order and interpretation. Neither patients nor physicians are aware of PSA-related outcomes. Therefore, each hospital should hold sessions on PSA testing and inform physicians about them. Furthermore, a detailed public education should be provided and seminars should be organized at the national level.

Keywords: PSA, laboratory, requested analysis

Özet: Amaç: Günümüzde prostat kanserinin tanı, tedavi ve takiplerinde yaygın olarak prostatik spesifik antijen (PSA) kullanılmaktadır. Fakat PSA organ spesifik olmasına rağmen kanser spesifik değildir. PSA düzeyi yüksek olanlarda prostat biyopsi sonucunun normal gelmesi, diğer taraftan PSA düzeyi düşük hastalarda biyopsi sonucu kanser gelmesinden dolayı PSA hem klinisyende hem de hastada sıkıntı yaratmaktadır. Aynı zamanda aynı kişide PSA'da farklı sonuçların çıkması ve PSA'da küçük-büyük değişimler her iki tarafı da huzursuz etmektedir. Bu çalışmada; hiçbir istem kısıtlaması olmayan PSA istemleri analiz edilmiştir.

Metod: Ekim 2006–Mayıs 2013 tarihleri arasındaki PSA istemleri değerlendirildi.

Bulgular: 7100 kişiye 12107 adet tPSA, 5053 kişiye 7852 adet serbest PSA (sPSA) ölçümü yapılmıştı. 12107 tPSA isteğinin %73.6'sı üroloji, %26.4'sı diğer kliniklerden yapılmıştı. Prostat kanseri nedeniyle takip edilen hastalarda tPSA'nın daha sık bakılması gerektiğinden bu hastalar değerlen-

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dirme dışı bırakıldığında, %28.22 oranında bir yıldan kısa aralıklarla bakıldığını tespit ettik. tPSA bakılma sıklığı ortalama 91.84±1.21 gün (0–330) olarak hesaplandı. Ürolojide test istenen ve PSA>4.0 ng/ml üzerinde olan hasta sayısı 347 idi. Ancak, 77 hastaya biyopsi yapılmıştı ve 23 hastada prostat kanseri saptanmıştı (%29.8). Diğer hastalar hakkında hiçbir bilgi bulunamadı. 40 yaş altında tPSA bakılan hasta sayısı 287 idi. 40 yaş altı tPSA istemlerinin %25.43'ü üroloji kliniğinden geri kalanlar ise diğer branşlardan istenmişti.

Sonuç: PSA isteminde ve yorumlanmasında bir kaos ortamı söz konusudur. PSA sonuçlarından ne hastaların ne de doktorların haberi bulunmaktadır. Bu nedenle her hastanede PSA ile ilgili oturumlar düzenlenmeli, doktorlar bu konuda bilgilendirilmelidir. Ayrıca ulusal düzeyde topluma detaylı eğitimler verilmeli ve seminerler düzenlenmelidir.

Anahtar Kelimeler: PSA, laboratuvar, istem analizi

Introduction

Prostate cancer (PCa) is the second most common form of cancer in Turkey [1]. PSA screening tests are used for the early detection and treatment of PCa. The American Urology Association (AUA) recommends PSA screening in men aged 40 and above with a life expectancy of more than 10 years and informed of the benefits and potential risks of PCa screening. Screening is not recommended below the age of 40 or over 70 [2]. There is no integration of information processing between hospitals, so the same tests may be requested from the same patient many times. This imposes a severe economic burden. We therefore evaluated compliance with guidelines of PSA tests over approximately 6 years in our hospital.

We assessed total PSA (tPSA) and free PSA (fPSA) test numbers performed between October 2006 and May 2013, and the departments requesting the tests. tPSA and fPSA numbers in the 6-year study period were evaluated in terms of gender, outcomes in patients with high PSA, and whether or not these procedures were performed on the correct individuals and at the proper intervals. We also attempted to calculate the economic burden of unnecessary procedures.

A total of 12.107 tPSA measurements were performed on 7100 individuals and 7852 fPSA measurements in 5053 individuals during the study period. One in four PSA requests were from non-urological branches. When patients under monitoring for PCa were excluded from the analysis, since tPSA levels need to be investigated more frequently in these, 3417 (28.22%) of the 12.107 tPSA tests were performed at intervals less than 1 year despite not involving diagnosis of PCa.

Table 1: Age and rate of PSA orders: Urology and the other branches.

Age group (years)	Level of tests requested from urology (%)	Level of requests from other branches (%)
<40	32.4	77.6
40–49	56	44
50–70	76	24
>80	58	42

tPSA was studied only once in 6 years in 4837 patients. tPSA values were normal in 4318 of these but above 4.0 ng/ml in 519. Mean age of the patients tested for PSA for the first time was 61.2. Two hundred eighty-seven of the 7100 patients undergoing PSA tests in our hospital were aged under 40, 913 were in the 40–50 age group, and 326 were aged 80 or over. The number of tests performed over 80 was 565.

PSA test requests from urology and other clinics are shown in the table. Most tests in the 50–70 age group, when PSA screening is recommended, were requested by urology clinics, while inapropriate requests were mainly from others.

tPSA was above 4.0 ng/ml in 1140 patients, who received 2040 tests. Of these, 519 were not repeated. A total of 1521 tPSA tests were performed on the remaining 621 patients (mean 2.4 times). Additionally, 74.4% of repeat requests in patients with tPSA above 4.0 ng/ml came from urology clinics. Requests by clinics in this group are shown in the graph (Fig. 1). tPSA≥4.0 ng/dl was determined in 347 patients in our urology clinic between February 2012 and June 2013. The number of prostate biopsies during that time was 77 (22.1%). There were no additional data for other patients with tPSA≥4.0 ng/dl. Prostate cancer was determined in 23 of the 77 patients undergoing biopsy (29.8%).

Prostate cancer screening is still the subject of debate [3]. The ERSPC screening study reported a 20–31% decrease in mortality [4,5]. In contrast, the PLCO study showed that screening was not beneficial [6].

The Turkish Biochemistry Society Guideline recommendation reads, 'PSA should be requested before prostate manipulation and blood specimens should be taken in that event; requests for sPSA should be performed in patients at high risk and with tPSA 2.0–10 ug/L.' [7]. In our hospital 12.107 tests were requested from 710 patients over 6 years. Mean per capita test number was 1.7. At the macro

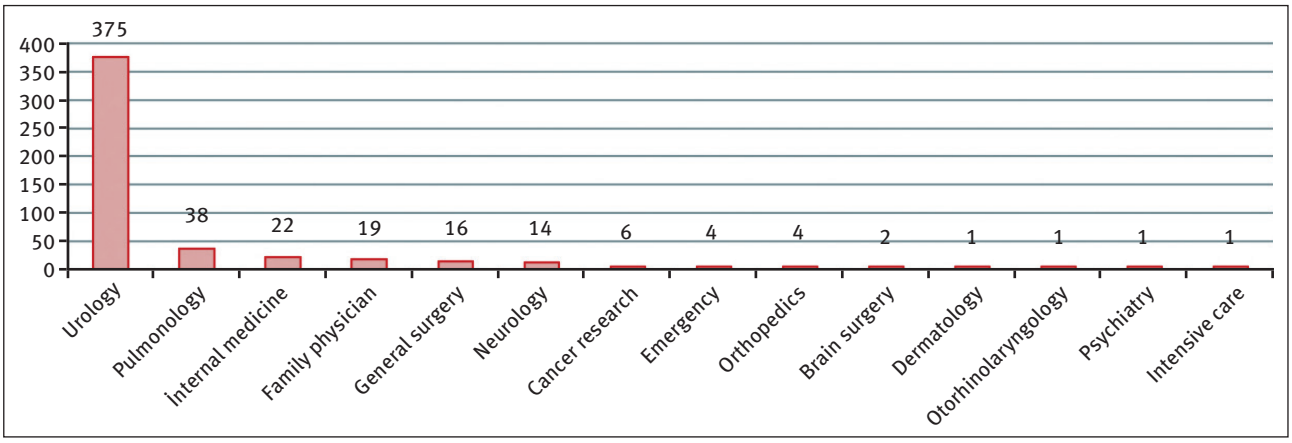


Figure 1: Clinics requesting tests of patients with PSA >4 ng/ml.

level; 1.7 PSA tests per capita annually appear normal. However, PSA was within normal limits in 5960 individuals. Therefore, 5960 would be expected to undergo PSA once a year. PSA was tested once in 4837 individuals in the 6-year period, twice in 1163 individuals, 3 times in 525, 4 times in 234, 5 times in 164 and 6 times in 73. Thus only 73 patients underwent PSA the expected number of times. PSA was tested between 6 and 31 times in 133 patients. In other words, not only '*PSA Screening*' but also '*PSA Testing*' is performed in our hospital, and is not performed in line with the rules.

PSA tests are requested by all branches in our hospital, in addition to urology. Over the study period, 26.4% of PSA requests were from other clinics. Additionally, 77.6% of requests under the age of 40 and 42% over the age of 80 were from non-urology branches. In the 50–70 age group, 76% of PSA requests were from urology and 24% from other branches (Table 1). This suggests that PSA is not requested in a highly aware manner by non-urology branches. The outcomes in cases with high PSA values are also unclear. It is unclear what happened to patients with tests requested by other clinics whose PSA values were high. The majority of these patients did not present to our urology clinic. It is unclear whether they presented to the urology clinic of another hospital.

PSA was also investigated in 33 female patients. We attribute this to clerical error. Although PSA screening is recommended for men with a life expectancy greater than 10 years [2,7,8], 326 patients tested were over 80. A total of 7178 sPSA tests were performed in the 4379 patients who did not need them. We interpret this as sPSA being performed carelessly and inappropriately.

Of the 12.107 PSA measurements performed, 4302 (35.5%) were unnecessary, with 3417 tests performed before time, 565 over the age of 80, 33 in women and 287 below the age of 40. The individuals tested once in the study period may also be regarded as being tested unnecessarily since they did not comply with the screening program. If these are added, the number of unnecessary tests PSA is 9139 (75.4%). In addition, 7178 (91.4%) of the 7852 sPSA tests were performed on individuals who did not need them. Biopsy was performed on 22% of patients with high PSA. Most PSA tests did not serve an appropriate purpose. Calculation of the kits used for these tests, the time spent on measurement, device use and personnel time reveals a serious, unnecessary cost (143.560 Turkish lira in 6 years). In order to prevent unnecessary testing, and therefore costs, physicians and patients must be made aware of PSA tests and restrictions must be placed on requests for them.

Analysis of PSA requests in our hospital shows that PSA measurement alone was performed on the majority of patients, but that these were generally performed on suitable patients, but at unsuitable intervals and did not serve their intended purpose. This may also reflect the nationwide reality.

Conflict of Interest: The authors have no conflict of interest.

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