Annals of Medical Research
DOI: 10.5455/annalsmedres.2018.10.225 2019;26(2):177-9

Original Article

How to prevent unnecessary request prostate-specific antigen testing?

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Abstract

Aim: In this study, it was aimed to show how to limit the unnecessary requests of free prostate-specific antigen (fPSA) test changes with some regulations.

Material and Methods: The fPSA requirements when total PSA values below 4 ng/mL or above 10 ng/mL were considered 'unnecessary test request'. To do this, the relevant physicians were informed and the fPSA test was arranged to have a separate second window on the request panel and physicians were requested only tPSA test requests. An additional fPSA test was conducted by the laboratory staff from patients with a tPSA score of 4-10 ng / mL.

Results: It was seen that 1236 fPSA and 1292 tPSA tests (fPSA/tPSA = 95.6%) were performed in our research hospital laboratory between January 17,.2017 and March 09,2017 while 328 fPSA and 1139 tPSA tests were also done between January 17, 2018 and March 09, 2018 (fPSA / tPSA = 28.7%). The ratio of sPSA test request to tPSA test request was found to be reduced by 66.9%.

Conclusion: This study limited significant hospital expenditure and labor loss reducing the number of unnecessary fPSA tests with regulations made at the test prompt.

Keywords: Prostate-Specific Antigen; Unnecessary Testing Request; Laboratory; Cost Analysis.

INTRODUCTION

Laboratory tests are very important in the diagnosis and follow-up of diseases, and the contribution of test results to disease diagnoses is 70% (1). The use of laboratory tests has been increasing day by day due to the shortening of the test result time with the developing technology, the increasing number and variety of tests in the laboratories, the increase of the elderly population and the chronic diseases parallel to this (2). However, the most important reason for the increase in laboratory usage is unnecessary test requests (3). Prostate specific antigen (PSA) is synthesized from normal, hyperplastic or cancerous, all prostate epithelial cells, and elevation suggests cancer, benign prostatic hyperplasia, infection and chronic inflammation. This situation reduces tumor specificity as a tumor marker of PSA and PSA-based screening alone leads to false diagnosis of cancer and unnecessary biopsies (4). Measurements and calculations such as PSA density, PSA change and rate, free PSA ratio are used to prevent unnecessary biopsy of the benign group at 4-10 ng/ml PSA values, which are defined as 'gray zone', with a cancer rate of around 20-25% (4-7). Many retrospective and prospective studies have shown that the use of the ratio of fPSA/tPSA calculated with the results of the same sample in patients with PSA levels of 4-10 ng mL is useful in the benign-malign differentiation (8). In this study, it was aimed to show how the unnecessary sPSA test ratio changes with some regulations.

MATERIAL and METHODS

In this retrospective study, fPSA and tPSA test requests were analyzed in the laboratory information system (LIS) of Erzincan Mengucek Gazi Training and Research Hospital between January 17, 2017 and March 09, 2017, and also January 17, 2018 and March 09, 2018. The number of tests in the next one and a half month period after the following arrangements were made compared to the same period of the previous year. All of the completed fPSA and tPSA tests with enrollment in our hospital LIS were included in the study for the specified periods. However, tests requests but not finalized (e.g. rejected for

Received: 18.10.2018 **Accepted:** 09.11.2018 **Available online:** 12.11.2018
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preanalytical error) were not included in the study. Firstly, a number of fPSA and tPSA test requests were obtained by LIS. Then calculate the frequency as a percentage of using the following formula: the number of fPSA test request ÷ the number of tPSA test request × 100.

fPSA requests, made when PSA values total, were below 4 ng/ml or above 10 ng/ml, were considered as 'unnecessary testing request'. To do this, the relevant physicians were informed and the fPSA test was arranged to have a separate second window on the request panel and physicians requested only tPSA test requests. An additional fPSA test was conducted by the laboratory staff from patients with a PSA score of 4-10 ng/mL.

Statistical analysis

Percentage values of the data obtained from LIS in the calculation are calculated using Microsoft Office Excel program.

RESULTS

We performed 1236 fPSA and 1292 tPSA tests (fPSA / tPSA = 95.6%) in the hospital laboratory in first three months of 2017 while 328 fPSA and 1139 tPSA tests were performed in first three months of 2018 (fPSA / tPSA = 28.7%) (Table 1). The ratio of fPSA test request to tPSA test request was found to be significantly reduced by 66.9% after the following arrangements when compared to the same period of the previous year. A total of 25 biopsies were made specified dates in 2017, of which 14 were benign and 11 were malignant. A total of 35 biopsies were made specified dates in 2018, of which 25 were benign and 10 were malignant (Table 2).

Table 1. Number of the test requests

Parameter	17.01.2017 to 03.03.2017 test numbers	17.01.2018 to 09.03.2018 test numbers
tPSA	1292	1139
fPSA	1236	328
fPSA/tPSA (% of test number)	95.6	28.7

Abbreviations: fPSA; free prostate-specific antigen, tPSA; total prostate-specific antigen

Table 2. Comparison of free and total prostate-specific antigen test values according to biopsy results

	17.01.2017 to 03.03.2017			17.01.2018 to 09.03.2018		
Biopsy results	fPSA Mean±SD (n)	tPSA Mean±SD (n)	fPSA/tPSA Mean±SD (n)	fPSA Mean±SD (n)	tPSA Mean±SD (n)	fPSA/tPSA Mean±SD (n)
BPH	1.6±1.2 (14)	8.6±4.7 (14)	0.20±0.09 (14)	2.4±1.1 (25)	9.0±3.9 (25)	0.28 ± 0.09 (25)
Prostate Carsinoma	1.5±0.6 (11)	8.1±5.2 (11)	0.23±0.11 (11)	4.4±7.3 (10)	17.9±19.7 (10)	0.18±0.09 (10)

Abbreviations: BPH; benign prostatic hyperplasia, fPSA; free prostate-specific antigen, tPSA; total prostate-specific antigen

DISCUSSION

The role of the medical laboratories in the diagnosis and treatment of diseases has a great importance [9]. Most of the clinicians evaluate patients according to the laboratory diagnostic tests to make objective examination. The task of the laboratory begins with the clinician asking "which tests do I want" and ends when the results are used for patient's benefit. In this context these days the workloads of the laboratories and accordingly the quality service giving responsibilities have increased greatly. Clinicians expect a precise and clear outcome from laboratory analyzes. The aim of the required tests is to minimize the clinical uncertainty. But biochemical tests do not have 100% sensitivity and specificity also known.

The allocated budgets for health services are increasing. Therefore, laboratory analyzes are leading the studies to evaluate the limitations that can be made. It is suggested that reducing the number of inappropriate laboratory requests may reduce the total costs, medical errors and injury rates. In the studies conducted, the proportion of inappropriate laboratory requests was given as 11to 70% for biochemistry and hematology tests and 5 to 95% for urine and microbiology tests (10-12).

In the current study, the fPSA / tPSA test request rate was reduced from 95.6% to 28.7% after the regulations, resulting in a reduction of approximately 66.9%. The diagnosis of cancer based on biopsy results in a specified date in 2017 and 2018, the number of cases area has been close to each other. Kocaturk et al. found that sPSA request, when 52% of PSA levels below 4 ng/mL and 45% of PSA levels above 10 ng/ mL were unnecessary (13). This rate is lower than we found in our study (66.9%). This suggests that unnecessary fPSA testing is too high in our hospital before the prescribed regulations. According to the results of the Spanish Clinical Chemistry Society and the Molecular Pathology Quality Assessment Program, it was reported that the most common sample rejection was untreated samples (37.5%) in the clinical laboratory (14). Kirchner et al. stated that faulty sample, faulty request, unreceived samples were (5%, 4.1% and 1.7%, respectively) the most common causes of sample rejection in the laboratory (15). As it can be seen,, unnecessary and faulty testing in laboratories is a common problem and it is necessary to be solved.

It is extremely important to make prompt requests in the right person for effective use of the tests. It is believed that regulations such as taking the necessary training

on appropriate test screening and complying with the necessary algorithms, arranging appropriate request forms, accessing the old results of the patients through laboratory information systems, ensuring cooperation between clinician and laboratory specialist and reducing the burden of clinicians by requiring reflex test can reduce unnecessary test requests. Laboratory tests are relatively cheap and easy reachable shortening of time, incorrect and the application of the lost protocols, patient prints and expectations, laboratory communication between specialists and clinicians deficiencies and clinicians themselves impulse (a growing number of medical liability cases to avoid or avoid any cause for lack of experience) are the main causes of unnecessary testing requests.

CONCLUSION

In this context, laboratory experts should play a more active role in seeking correct testing. Medical biochemists should communicate and collaborate with the clinician not only in the preanalytical and postanalytical period but also in the preanalytic period. It will be useful in all respects to create algorithms, to follow these algorithms and to monitor compliance rates by laboratory experts. Reduced number of unnecessary fPSA tests with test-driven arrangements prevented significant financial and labor loss.

Competing interests: The authors declare that they have no competing interest.
Financial Disclosure: There are no financial supports
Ethical approval: This work has been approved by the Institutional Review Board.

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