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RESEARCH ARTICLE

Inappropriate requests of viral hepatitis serologic tests

Viral hepatit serolojik testlerinin uygunsuz istemi

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ABSTRACT

Objectives: Inappropriate end excessive requests of laboratory tests are labor intensive and a vast burden of cost. Diagnostic algorithms are advised to prevent inappropriate and excessive usage of tests. In this study it was aimed to determine inappropriate test ordering rates and cost.

Materials and methods: To assess the number of inappropriate test orders, laboratory records of samples sent for hepatitis A and B viral serologic tests were evaluated retrospectively with respect to diagnostic algorithms. Orders including serological marker groups without adequate clinical information whether or not the order was inappropriate was excluded from the study.

Results: According to the diagnostic algorithms 1.452 anti-HAV IgM tests, 1.452 anti-HAV total tests, 208 anti-HBs tests, 208 anti-HBc total tests, 1.210 anti-HBc IgM tests, 1.358 HBeAg tests and 1.216 anti-HBe tests are inappropriate requests. Total cost of these tests is calculated as 56.153 TL.

Conclusion: This study shows that a significant amount of hepatitis serologic tests are inappropriate requests. Diagnostic algorithms for hepatitis should be used more commonly to decrease the amount of inappropriate requests result in significant workload and cost. *J Clin Exp Invest 2012; 3(2): 181-184*

Key words: Hepatitis, serologic test, algorithms

ÖZET

Amaç: Laboratuvar testlerinin uygunsuz ve aşırı istemi ciddi bir iş yükü ve maliyete neden olmaktadır. Gereksiz ve fazla test kullanımını önlemek için çeşitli tanısal algoritmalar önerilmektedir. Bu çalışmada tanısal algoritmalara göre hepatit serolojisinde uygunsuz test istemlerinin oranı ve getirdiği mali yükün belirlenmesi amaçlanmıştır.

Gereç ve yöntem: Uygunsuz test istemlerinin sayısının belirlenmesi için hepatit A ve B viral serolojik testleri viral hepatit tanısında kullanılan serolojik tanısal algoritmalara göre retrospektif olarak değerlendirilmiştir. Hepatit A ve B tanısında kullanılan testlerden hastanın klinik durumunu ortaya koyacak şekilde yapılan test istemleri çalışmaya dahil edilmiş, hastalığın klinik evresi ile ilgili yetersiz test istemi nedeniyle bilgi edinilemeyen testler çalışmadan çıkarılmıştır.

Bulgular: Tanısal algoritmalara gore; 1452 anti-HAV IgM testinin, 1452 anti-HAV total testinin, 208 anti-HBs testinin, 208 anti-HBc total testinin, 1210 anti-HBc IgM testinin, 1358 HBeAg testinin, 1216 anti-HBe testinin uygunsuz istem olduğu belirlenmiştir. Bu testlerin toplam maliyeti 56.153 TL olarak hesaplanmıştır.

Sonuç: Bu çalışma viral hepatit serolojisinde kullanılan testlerin önemli bir kısmının uygunsuz istem olduğunu göstermektedir. Tanısal algoritmalar, ciddi bir iş yükü ve maliyet getiren uygunsuz test istemlerini azaltmak için daha yaygın olarak kullanılmalıdır.

Anahtar kelimeler: Hepatit, serolojik test, algoritma

INTRODUCTION

The utilization of laboratory services has increased during the past several decades, which raised concerns about the appropriate use of laboratory.[1-3] The appropriate use of laboratory tests is necessary for optimal patient care. Laboratory data are important in the medical decision making process and influence 70 % of medical diagnoses[4]. Increased laboratory use is appropriate if it allows accurate diagnosis to be made, ideal treatment to be identified and monitored, accurate prognoses to be established, and patients' hospital stays to be shortened. Physician ordering practices have been analysis extensively, inappropriate test ordering, total physician visits found to be the reason for increased laboratory use.[3,5-8] Over ordering may be the result of inexperience or lack of knowledge about the appropriate use of tests, failure to check previous results, test ordering routines that are difficult to change or fear of errors of omission and litigation. Moreover pa-

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tients actively ask for tests and often attach greater value to test results than is justified.[9-12]

Hepatitis serology is a suitable test group for application of diagnostic algorithms, as the combination of test results makes it possible to determine the causative viral agent and the stage of infection.[13] In our country, hepatitis A virus (HAV), hepatitis B virus (HBV) infections are important health care problems.[14-16] Common markers used in hepatitis A and B infections are anti-HAV IgM and anti-HAV total, HBsAg, anti-HBs, anti-HBc IgM, anti-HBc total, HBe Ag, and anti-HBe. There are many algorithms guiding to adding or cancelling of one test depending on the result to another have been established for hepatitis serology.[17-20] In this study it was aimed to determine inappropriate test ordering rates of viral hepatitis and find a solution to prevent excessive test requests.

MATERIALS AND METHODS

Tavşanlı General Hospital is a 230 bed secondary care hospital located in Western Turkey. A total of 50.907 serological tests for hepatitis viruses; hepatitis A virus (HAV), hepatitis B virus (HBV), and hepatitis C virus (HCV) were performed in the microbiology laboratory between January 2010 and December 2011 which were included in this study. The laboratory performed all of the tests indicated by the physician. To assess the number of inappropriate test orders, laboratory records of samples sent for hepatitis A and B serology were reviewed and evaluated retrospectively according to the algorithms for serological diagnosis of viral hepatitis.

For the HAV serology, anti-HAV IgM and anti-HAV total (IgM + IgG) were accepted as the markers of acute infection and immune status, respectively[19]. Anti HAV Ig M is the evidence of acute infection. Anti HAV total reflects the immune status of the patient; positivity means acute or previously infection or immunisation by vaccination.

Hepatitis B virus surface antigen (HBsAg) is the most important marker for diagnosis in the algorithm used for HBV serology.[21] A positive test result followed by a positive anti-HBc IgM suggests an acute infection. HBs Ag positivity with the lack of anti-HBc IgM suggests the chronic infection. When HBsAg is negative, anti-HBc total and anti-HBs test results are used to evaluate the immune and/or infection status of the patient. The positive result of the anti-HBc total shows an immunity result from a previously infection, and the positive result of anti-HBs with the negative anti-HBc total result shows the immunisation by the vaccination. Isolated anti-HBc total positive result may indicate a remote infection, a window period or a false positive result. In this case additional tests are needed to determine the immune status of the patient.

In this study only the orders requesting the whole six serological markers of HBV; HBsAg, anti-HBs, anti-HBc IgM, anti-HBc total, HBe Ag, and anti-HBe were included in the analysis. Additionally, test requests for HAV including both anti-HAV IgM and anti-HAV total in the same request form were included in the analysis. Test results which were unhelpful for approaching the laboratory diagnosis, were considered to be inappropriate. As the algorithm requires testing of HBsAg first, the rate of inappropriate test orders for HBsAg was not evaluated. Orders requesting fewer than six markers were excluded from the analysis as, the clinical information about these cases were inconclusive.

The prices of the tests were calculated according to the Social Insurance Foundation. Inappropriate test requests were evaluated according to algorithms.[19,21]

RESULTS

A total of 3.296 tests for HAV serological markers were ordered in 1.844 requests. There were 78 (4.2%) requests ordering only anti-HAV IgM, 314 (17%) requests ordering only anti-HAV total and the remaining 1.452 (78.7%) forms included both of the tests. The data suggested that 1.516 (52.2%) of 2.904 test requests were inappropriate for the diagnosis of hepatitis A infection.

The laboratory received 14.084 request forms for HBV serological markers. Of these requests 1.618 (11.5%) had all of the six serologic markers (HBs Ag, anti-HBs, anti-HBc IgM, anti-HBc total, HBeAg, anti-HBe) for HBV. The distribution of inappropriate test requests for serological markers of HBV according to the algorithm is shown in Table 1. The algorithm failed to conclude six samples, which had atypical profiles.

The prices of the tests according to the Social Insurance Foundation are; anti-HAV IgM 8 TL, anti-HAV total 8 TL, HBsAg 8 TL, anti-HBs 8 TL, anti-HBc IgM 8 TL, anti-HBc total 8 TL, HBeAg 7.5 TL, anti-HBe 8 TL. The total cost of the inappropriate tests is 56.153 TL.

Table 1. Inappropriate test orders for the serological markers of HBV infection

Tests	Total orders (n)	Orders included in the analysis (n)	Inappropriate Orders n (%)
Anti-HBs	12.255	1.618	208 (12.9)
Anti-HBc total	2.239	1.618	208 (12.9)
Anti-HBc IgM	2.382	1.618	1.210 (74.8)
HBeAg	2.331	1.618	1.358 (83.9)
Anti-HBe	1.804	1.618	1.216 (75.2)

DISCUSSION

Health costs are increasing in our country like all around the world. Public health expenditures has increased 2.8 folds between 2003 and 2010 in Turkey.[21] Public tends to decrease this cost and tries to find the suitable treatment for lower expenditures. This is the reason for cost-effective approach to patients. As hepatitis viruses are important health care problem for our country cost-effective approach to patients with suspected hepatitis is important.[21,22]

The results of the present study show that inappropriate tests were because of doctors resorting to a "blanket" ordering strategy as described by van Walraven with rates 79% for HAV and 11% for HBV[12]. The reasons for blanket strategy are; complexity of hepatitis serology testing according to the stage of the infection, tick boxes in request forms or screens, physician's fear from missing important diagnosis, loss of the physician's knowledge about algorithms to interpret the results, some of the physicians may wish to spare overall hospital expense by reducing the diagnostic period by ordering all of the serologic markers at once.[12,13,23,24] Our study show that blanket strategy for hepatitis B serology is 11% in our hospital, but 43% in the study of Ozbek et al. It was thought that it might be because of the fact that physicians in our hospital are specialist, but they are getting educated in the study by Ozbek et al.[25]

Sharma et al. developed an automated test rejection and computerized reminders on repeat requesting behavior of hospital clinicians and general practitioners for biochemical parameters. A computerized scheme of automatic test rejection was introduced in 2000 and the effect on thyroid stimulating hormone, ferritin, glycated haemoglobin and vitamin B12 + folate tests assessed by the retrospective interrogation of the laboratory database in 2001. The data supported the contention that tests are being unnecessarily repeated. Re-audit after 4 years looked at the effect of these reminders on physician repeat requesting practice. Against a background increased workload of 37,4 % for these tests over the 4 -year period, the mean percentage of declined tests fell from 4,0 % in 2001 to 2,8 % in 2005.[26] This suggests that computerized test request systems can decline the vast of workload and money.

In a system in which the hepatitis serological test orders are made only by the physician as an obligation, application of a diagnostic algorithm by the doctors might cause time loss and repetitive bleeding of the patients. Because, the specific diagnosis of the causative agent of viral load depends primarily on serological tests, it may be suggested that the serology laboratory should apply the relevant algorithm to detect the agent responsible for viral hepatitis to assess the immune status of patients.[7,19] But, introducing algorithms for the diagnosis of viral hepatitis, especially when applied by the serology laboratory, may lead to some problems. The primary responsibility of the patients belong to their physicians, and adding or cancelling of diagnostic tests not included in the requisition forms, as the algorithm requires, might cause problems in charging as well as issues regarding malpractice.[17,27]

Although using algorithms in diagnosis of hepatitis viruses, van Walraven et al., showed that introducing an algorithm was unexpectedly associated with a significant increase in serologic tests utilization.[12] Computerized physician ward ordering systems have been implemented in variety of sites, and have been found to improve efficiency of care. Such behavior might be used according to the algorithms of hepatitis virus serologic diagnosis.[28-30]

To prevent the inappropriate tests; clinicians should be educated about diagnostic algorithms. Additionally decision support software might be used by the clinicians while requesting tests. If this software provides the previous test data about the patient this may prevent the test repeats for the patient.

This study shows that a significant amount of hepatitis serological tests are inappropriate requests. Diagnostic algorithms should be used more commonly to decrease the amount of inappropriate requisitions resulting to a significant workload and cost.

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