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Research Article

PRE-SURGICAL TESTS FOR VIRAL HEPATITIS AND HUMAN IMMUNODEFICIENCY VIRUS - A HIDDEN DANGER

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ABSTRACT

Introduction: There are reasons that patients negative for Hepatitis B (HBV), Hepatitis C (HCV) and HIV on Pre-surgical tests may still be infected with either of these virus and may be potentially dangerous for others. A new danger is that Sero-positive patients may get forged negative report to save the cost of Personal protective equipments (PPE) used in their surgery.

Material & Methods: This retrospective study was conducted at Pankaj ENT Hospital, Lucknow, India. on the patients who were admitted for elective ENT surgeries between March 2014 to December 2019. In all serological negative patients Rapid Diagnostic card tests (RDT) were done just before surgery and results analyzed.

Results: Prevalence of HBV was 0.23%, HCV was 0.05% and HIV 0.02%, which was much less than other studies. There was male dominance in all three viral infections and most common age group involved was 12 to 45 years. 3 patients with Hepatitis B and one with Hepatitis C was found positive in RDT on the day of surgery while they all had negative serological reports in pre-surgical test battery.

Conclusion: Rapid Diagnostic Tests for HBV, HCV and HIV doing just prior to surgery at the hospital itself would be a good practice to reduce the chances of getting these infections by the surgeon, hospital staff and to other patients. It is easy, cheap and fast.

INTRODUCTION

In this retrospective study we analyzed the prevalence of Hepatitis B, C and HIV infections in patients planned for surgery. There are many reasons that patients negative for Hepatitis B, Hepatitis C and HIV on Pre-surgical tests may still be infected with either of these virus and may be potentially dangerous for others. A new danger is that Sero-positive patients may get forged negative report to save the cost of Personal protective equipments (PPE) used in their surgery.

Review of Literature

Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Human Immunodeficiency Virus (HIV), has emerged as a leading cause of morbidity. Health care personal who have exposure to blood are at risk of Hepatitis virus and the HIV infection. Proper selection of the quality screening tests, adequate control measures and effective biomedical waste inactivation procedures can ensure the reduction in the acquiring transfusion. The annual incidence of HBV infection in surgeons is estimated 50 times greater than that in general population, and more than twice that of physicians. Other high-risk groups comprise recipients of blood transfusions, prostitutes, percutaneous drug abusers, infants of HBV carrier mothers, recipients of solid organ transplants and immunocompromised patients.(1)

Screening for HIV, HBV and HCV as a part of routine pre-operative investigations are mandatory in Tertiary care centers to assess their prevalence and to plan better preventive strategies. to prevent transmission to surgical team. Universal precaution by using enhanced personal protective equipments (PPE). post-Exposure prophylaxis (PEP). Patients counseling about disease and further management. (2)

The presence of hepatitis B surface antigen (HBsAg) in the blood indicates the presence of an HBV infection. On the other hand, antibody to HBsAg (anti-HBs) indicates immunity to HBV infection. The antibody to the hepatitis B core antigen (anti-HBc) indicates that the individual has been exposed to the intact hepatitis B virus at some time in their life. IgM anti-HBc indicates that the exposure took place within the past 3–6 months. The presence of early antigen (HBeAg) or antibody to HBeAg (anti-HBe) reflects viral replicative activity such that

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HBeAg positive patients have active viral replication (all body fluids should be considered potentially infectious), whereas HBeAg negative but anti-HBe positive patients usually have inactive viral replication (generally, only the patient's blood is considered infectious to others). Unfortunately, there are sufficient exceptions to the latter interpretation (in particular a mutation to the pre-core gene that results in the absence of serum HBeAg despite active viral replication and viremia) that all body fluids from an HBsAg positive individual regardless of their HBeAg/anti-HBe status, should be considered infectious. (3)

Although maternal-infant transmission is the most common route of HBV infections in the world at the present time, in industrialized nations, parenteral drug abuse and needle stick exposures represent significant high-risk activities. Needle stick exposures involving blood from an individual with high levels of viral replication (HBeAg positive or high HBV-DNA levels) tend to result in HBV infections occurring in approximately 60% of cases, whereas when the infection in the source is not actively replicating (HBeAg negative or low HBV-DNA levels), the figure falls to approximately 30% . In addition to the size of the inoculum, features of the needle itself, hollow or solid, appear to be important factors influencing the risk of viral transmission. (4,5)

The prevalence of HBV infection among health care workers is 3–5-fold higher than that of the general population with surgeons (particularly orthopedic surgeons and gynecologists) and dentists having the highest reported rates. (6,7)

The annual rate of HBV infections occurring in health care workers ranges between 0.5 and 5% compared with an annual rate of 0.1% in the general population. (8)

Viral Hepatitis and HIV infection in health care workers are related to several factors including the degree of exposure to patient's blood or body fluids, blood-contaminated sharps and the duration of employment. (9)

An additional risk factor for health care workers is the underlying prevalence of HBV in the patient population with higher risks in urban hospitals and tertiary care centers than those in rural and primary care hospitals. (10)

The following Personal Protective Equipments (PPE) are thought to decrease the risk of intraoperative transmission: use of double latex gloves, changed hourly, enclosed hood and face-masks and operative isolator with umbilical-cord aspirator, knee-length impermeable gowns, a combination of shoe-covers with coverage to the knee and disposable drapes. Inadvertent pricks or cuts should be bled and washed immediately with iodine, soap and water. The injured person should then be considered for immunopro-phylaxis. (11)

Hepatitis C is a contagious liver disease with. Every year 3-4 million people are infected with the hepatitis C virus. About 130-150 people are chronically infected and are at risk of developing liver cirrhosis and liver or cancer. More than 700,000 people die from hepatitis C-related liver diseases. High risk group for screening is similar to HBV. Hepatitis C does not always require treatment as the immune response in some people will clear the infection, some carrier of chronic infection do not develop liver damage. There is no vaccine against HCV, so prevention is mandatory. (12)

AIDS, the acquired immune-deficiency syndrome is a fatal illness caused by a retrovirus known as human immune-deficiency virus (HIV) which makes victim's body vulnerable to host of life-threatening opportunistic infections for life long. According to the estimates for the year 2015, 2.1 million people were living with HIV in India, with estimated 86,300 new HIV infections. The HIV prevalence in adults (15-49years) was .26 per cent (.30% in men and .22% in women). Andhra Pradesh and Telangana, Bihar, Gujarat and Uttar Pradesh account for 47%of total new infections among adults. The AIDS related deaths started to show declining trends with rapid expansion of access to ART in the country. (13)

It may not be well appreciated by the non-specialists that a patient with negative serology may be in a sero-conversion window or be a occult carrier and that precautions, including the use of PPE might still need to be followed. A study reported on blood donors from New Delhi showed that several additional HBV, HCV and HIV infection could be detected using more sensitive nucleic acid amplification test (NAT) when conventional serology were non-reactive.

In order to save time and money, some laboratories resort to rapid tests for HIV, HBV and HCV. These rapid tests have limitations. In a study from the ICMR Virus Unit in Kolkata, it was revealed that, out of the 612 serum samples reported as non-reactive by rapid immuno-diagnostic tests, 15.7% were sero-positive by ELISA and 11% were RNA positive by RT-PCR test. Significant variation in the performance of HCV kit efficiency has been reported from ICMR at Kolkata, along with relatively low sensitivity of HIV and HCV rapid test kits. (14)

The performance of RDTs (Rapid Diagnostic Test) in comparison to ELISA is suboptimal and RDT based serial testing algorithm cannot parallel the testing accuracy of an ELISA based approach. While false negatives by RDTs increase the proportion of HIV reactive individuals receiving negative reports, false positives by RDTs are a matter of ethical concern. The diagnostic limitations of RDTs can be overcome by possible inclusion of ELISA as a second screening assay, employing RDTs additionally detecting p24 antigen as screening assays, and confirmation of reactive samples by western blot to reduce false negative and false positive results, respectively. (15)

A patient with known Viral Infections should preferably be the last patient of the day to undergo surgery, with only the essential personnel present. Sharps-related injuries can be minimized by the creation of a neutral zone in which to pass instruments (hands-free technique), the use of needle-less instruments, staples and blunt needles to close fascia and muscle. Effective barrier precautions such as plastic aprons, face masks, goggles or shields and water-resistant aprons should be used. Double-gloving decreases the risk of exposure to patient's blood by 87% and the transmitted volume of blood by 95%, thus decreasing the potential viral load from an infected patient. (16)

Most private hospitals follow a policy of mandatory testing for HBsAg and HCV as a pre-operative requirement. Although this may have its advantages, it is not a replacement for universal precautions. (17)

Barrier techniques such as apron, gloves, mouth mask, eye glasses can be used. HBV is primarily transferred to the orthodontist and dental office staff through direct contact with blood or saliva through micro lesion in an ungloved hand or hand contaminated instruments. Compulsory wearing of

gloves, mask is always mandatory. Protective glasses are also must to prevent splutter into eyes. Washing hands with antimicrobial soap is also mandatory. We can also wear apron to prevent contamination of dresses. Instruments can be sterilized chemically. Chemicals used are ethyl alcohol, Sulfuric acid with potassium dichromate. These are disinfectants used for 30 minutes. The work area is sterilized by 70 percent isopropyl alcohol. Disposable tray sheets, suction tips, head rest cover, light handle cover, cover for switches and three way syringes must be used and changed for each patient.(18-23)

MATERIAL AND METHODS

This retrospective study was conducted at Pankaj ENT Hospital, Lucknow, India, done just before surgery at the hospital on the patients who were admitted for elective operations for ENT surgeries between March 2014 to December 2019. Patients were advised routine Pre surgical tests including HIV, HBsAg and HCV. In all serological negative patients Just before surgery blood samples were taken, centrifuged and Rapid Diagnostic tests (Meriscreen HbsAg, Meriscreen HCV and Quadro from Meril Life sciences, Gujrat for HBV, HCV and HIV respectively) for all three viral infections were performed. When the test for any viral infection came positive on card test, sample was sent for confirmatory tests in pathology lab.

All patients who were sero-negative on Pre-surgical tests and came out to be positive on RDT for HBV or HCV were taken detailed history pertaining to Hepatitis.

RESULTS

Out of 3440 patients who were admitted for elective surgeries total 8 came positive for HBV, 2 for HCV and 1 child was HIV positive. Male dominance was found in all three viral infections. (Table: no.1.)

Table 1 Total number of patients positive for HBV, HCV and HIV.

Total patients	Viral Infection	Males	Females	Total	Percentage
	HBV	5	3	8	0.23 %
	HCV	2	0	2	0.05 %
3440	HIV	1	0	1	0.02 %
	Total Patients - 3440				

All HBV and HCV patients were between 12 to 45 years of age, the only HIV positive patient was 11 year old child who had multiple Lymphadenopathy and was planned for node biopsy. (Table no. 2)

Table 2 Age distribution of HBV, HCV and HIV positive patients.

Age years	HBV	HCV	HIV	Total	Percentage
Less than 12	0	0	1	0	9 %
12 to 45	8	2	0	0	91 %
More than 45	0	0	0	0	0

3 patients who already had all three serological report as negative came out to be positive for HBV and one for HCV on RDT, On detailed history about Hepatitis two of hepatitis B positive and those of HCV positive patients told that they new about positivity of being Hepatitis infected. They were planned for operation somewhere else and when it was found that they had such infection they were told that the cost of consumables in form of PPE would increase in surgery as well as in further dressings etc. To save the cost of PPE they forged the report somehow to negative. (Table no.3).

Table 3 Patients who came with Sero-negative report but come out to be positive on card test.

HBV	HCV	HIV	Total no. of Patients
3	1	0	4

All the card tests which came positive for HBV and HCV were sent to pathology lab for confirmatory tests and were found positive from pathology lab on confirmatory tests. So there was no false positive results on RDT.

DISCUSSION

Hepatitis B was most common infection followed by Hepatitis C and then HIV in our study. There was no co –infection. This is in accordance with previous studies but occurrence of HBV was 0.23%, HCV was 0.05% and HIV 0.02% which was much less than other studies. Manjul Mohan *et al* reported Hepatitis B in 2.09%, Hepatitis C in 1.77% and HIV in 0.25% patients. (1) There was male dominance in all three viral infections and most common age group involved was 12 to 45 years age. 3 patients with Hepatitis B and one with Hepatitis C was found positive in RDT on the day of surgery while they all had negative serological reports in pre-surgical test battery. This could be due to window period, possible faulty test technique, false negative test report or forced report R. Ahmad *et al* reported that several additional HBV, HCV and HIV infection could be detected using more sensitive nucleic acid amplification test (NAT) when conventional serology were non-reactive.(14) We should take proper precautions in form of PPE even in negative serological test patients specially in minor procedures and emergencies as these also can be potentially dangerous. A new possibility was found in this study that a known positive viral infection patient getting forged negative report to save cost of PPE. Most studies reported chances of transmission of infection in Cardiac surgeries and no literature was found about ENT surgeries but the amount of bleeding in ENT surgery is at times profuse and close contact while doing surgery and examination makes ENT surgeon more prone for viral transmission. Drilling mastoid or skull bone may generate aerosol and may carry viral infection to nasal, oral mucosa and eyes. Saliva and nasal discharge handling is also potential source of infection. One dental literature mentions aerosol contamination of Viral Hepatitis. (23) So we suggest RDT for Hepatitis B, C and HIV immediate before surgery by ourselves as it is cheap, fast and Easy. This will further reduce the chance of infection transmission. There is a need for further scientific study to evaluate the chances of Viral transmission in Mastoid drilling and Nasal and Oral surgeries where profuse bleed and body secretions may come in contact with surgeon and staff. and large amount of aerosol is produced.

Emergency and small procedures pose a bigger problem as it is not practical to get pathological report in these cases due to time and cost factor. The real problem arises in emergencies like profuse Epistaxis. In such situation we suggest to take history to rule out prior viral infections and take sample for serological tests and start the treatment while technician is doing the RDT.

CONCLUSION

Rapid Diagnostic Tests for HBV, HCV and HIV doing just prior to surgery at the hospital itself would be a great practice

to reduce the chances of getting these infections by the surgeon, hospital staff and to other patients. It is easy, cheap and fast.

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