

THE FREQUENCY OF HBV, HCV AND HIV IN PATIENTS UNDERGOING PERCUTANEOUS MITRAL VALVULOPLASTY

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SUMMARY

Objective:

Determine the frequency of Hepatitis B, C and HIV in patients undergoing mitral valvuloplasty with multi-track balloon catheters.

Methods:

This was a cross sectional study in which 100 consecutive patients of both sexes underwent percutaneous Mitral Valvuloplasty with multi track balloons catheters at the National Institute of Cardiovascular Diseases Karachi from January 2003 to December, 2004. The Viral markers of Hepatitis B Surface Antigen & Antibodies against Hepatitis C & HIV was done in all patients undergoing PTMC prior to procedure.

Results:

Out of 100 patients undergoing PTMC with multi track balloon catheters, 78 patients were females while 22 of them were males. Screening of these patients showed that 14% of them were Sero positive for HBV while 8% positive for HCV. None of screened patients were HIV positive.

Conclusion:

- 1) The frequency of hepatitis B, C and HIV in patients undergoing PTMC (14% & 8%), as compared to normal population (2.56% for HBsAg) & (5.31% for anti-HCV) respectively.
- 2) In our country most of patients are non-affording and we have to reuse balloon catheters, so it should be mandatory to screen hepatitis B, C and HIV before undergoing invasive procedures. Balloon used in seropositive patients should be discarded.
- 3) National guidelines regarding reuse of various hardware and other preventive measures are mandatory for patient's safety.

Key words: Hepatitis B, Hepatitis C, HIV, PTMC, Multitrack Ballon Catheters.

INTRODUCTION

Cardiac catheters have become an essential element of current cardiovascular practice with several hundred thousand used each year in both diagnostic and interventional procedures. Other disposable devices are also increasingly being reused in a hospitals attempt to cut costs.^{1,2,3}

Percutaneous mitral balloon valvuloplasty is an alternative to surgical commissurotomy for patients with symptomatic mitral stenosis. [4] The multi-track

system for percutaneous mitral valvuloplasty is performed by two separate balloon catheters positioned on a single guide wire. The first catheter is introduced into the mitral orifice. Subsequently, a rapid exchange balloon catheter running on the same guide wire is inserted and lined up with the first catheter so the two are positioned side by side. Both balloons are then inflated simultaneously.^{3 5,6,7,8}

Sterilization that is of some concern to the public safety, which include the threat of Aids or hepatitis B transmission.^{9,10,11} If the cleaning and sterilization procedures are carried out properly, a reused catheter undamaged by handling will have the same physical appearance and will be almost as effective as a new

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catheter. Satisfactory sterilization requires either autoclaving or gassing with ethylene oxide.^{9,12}

ETO (ethylene oxide) sterilization is the most common method of industrial and hospital catheter sterilization patient upon reuse.^{9,12,13}

The risk of transmitting HIV with a percutaneous injury when the source person is infected with HIV is about 1/300 and other viruses such as hepatitis B have much higher transmission rates but considering that reused single-use devices are cleaned and disinfected and that cross-infections have not been documented, the risk rate is likely to be 1/500 or less (and possibly close to zero).^{10,11,14}

Cost savings to hospitals and patients is one of the primary goals of reuse.^{15,16,17,18}

Our study is based to screen HBV, HCV and HIV in patients before undergoing mitral valvuloplasty with multi-track balloon catheters and to make certain recommendations in which reused inventories are used in catheterization laboratory.

PATIENTS AND METHOD:

It was a consecutive cross-sectional study and was conducted at Catheterization Laboratory of National Institute of Cardiovascular diseases Karachi, from January 2003 to December 2004. The 100 patients of both sexes undergoing Mitral valvuloplasty by multi-track balloon catheters were consecutively selected, and referred for screening of HBsAG, anti-HCV, HIV at NICVD laboratory. A proforma was filled for each patient reporting about detailed history of blood transfusion, dental procedures, and drug abusers as well as physical examination of all patients with rheumatic mitral stenosis. The information noted in the in the proforma include name, age, gender, the complete blood count, liver function tests, blood urea, creatinine, serum electrolytes and x-ray chest of all patients prior to intervention. The viral markers of hepatitis -B surface antigen, and antibodies against hepatitis-C and HIV testing was done in all patients. Antibodies to HIV, HCV and Hepatitis B surface antigen (HBsAG) were done using enzymes linked Immunosorbant assay [ELISA] prior to procedure.

RESULTS: -

During the year 2003-2004, a total of 100 (78 were male and 22 female) patients screened for HBV, HCV and HIV before undergoing Mitral Valvuloplasty by multi-track balloon catheters in NICVD Karachi. The age distribution of patients was 14 as below 20 years, 59 as between 20-29 years and 27 as 30 years & above age group. On screening 14% patients was HBV positive while 8% was HCV positive and none of the patients were HIV positive. According to age, HBV positive in one (7%) patients with under 20 years of age, 10 (17%) patients between 20-29 years and 3 (11%) patients with 30 years & above age group. HCV positive in 5 (8.5%) patients between 20-29 years and 3 (11%) patients 30 years & above age group (Table-I). In HBV positive patients, 2 had history of blood transfusion and 1 had history of dental extraction, in HCV positive patient 5 had history of blood transfusion and 4 had history of dental extraction (Figure-I).

Figure - 1
History of Blood transfusion & Dental extraction in HBV & HCV patients

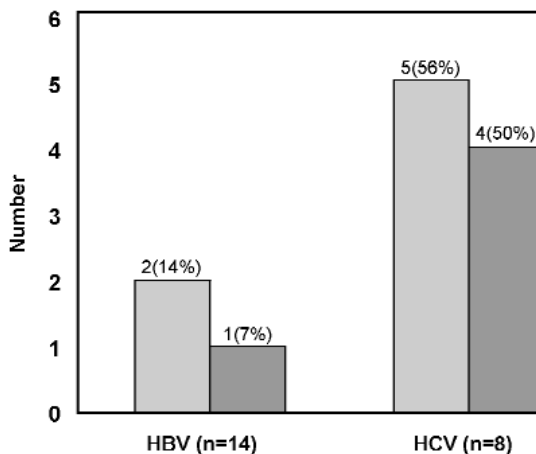


Table 1
Frequency of HBV & HCV according to age:

| Age in Years | No. of Subjects | HBV | | HCV | |
|--------------|-----------------|-----------|-------------|----------|------------|
| | | No. | % | No. | % |
| <20 | 14 | 1 | 7.1 | 0 | 0.0 |
| 20 - 29 | 59 | 10 | 16.9 | 5 | 8.5 |
| 30 & Above | 27 | 3 | 11.1 | 3 | 11.1 |
| Total | 100 | 14 | 14.0 | 8 | 8.0 |

DISCUSSION:

Pakistan has 4.9 million hepatitis B virus carriers where inadequate medical practices invite more harm than good. Prevalence among general public (5.31%) were positive for anti-HCV and (2.56%) individuals had positive HBsAg.¹⁹ Sero-prevalence of hepatitis B in our population was somewhat lower than what has been found in previous studies in Pakistan. The highest prevalence of HBsAg was reported to be 11% from Quetta.²⁰ In general Pakistan has been considered the area of low endemic for hepatitis B when surveyed in the Asian region.²¹ The high prevalence of hepatitis C and hepatitis B can be attributed to the sub-optimal blood transfusion practices in Pakistan.²¹ Normal ALT levels were found in 56% individuals who were positive for anti-HCV and in 85% who were positive for HBsAg.²²

Between 1988 and 1994 the prevalence of serologic markers of HBV infection was 0.4%, in the past two decades the actual rate of HBV infection in United States is estimated at approximately 300,000 cases per year.²³

The WHO estimates that more than 170 million individuals throughout the world are infected with HCV. An estimated 1.8% of the population in the United States was positive for HCV antibodies. Which corresponds to an estimated 3.9 million person with HCV infection nation wide.²⁴

Viral infections occur primarily in young adults because of lifestyle or occupational exposure.²³

In our country we could not find any available data to support the screening of patients for HBV, HCV and HIV before undergoing invasive procedures.

One of the studies conducted in India showed the prevalence of Hepatitis B virus increased by 1.5 times and that of Human Immunodeficiency virus by 2.5 fold.²⁴

As we are developing country we have poor patients who cannot afford the expenses of PTMC and mostly Undergo treatment sponsored by donations. The cost estimation of one PTMC with multi-track balloon catheters at our institute is Rs. 55,000, while with the reuse of catheters it can be brought down to about

Rs.10,000.

Our study shows that it is mandatory to do routine screening of hepatitis B, C and HIV before undergoing intervention with re-sterilize inventories to minimize the risk of transmission of infection from one patient to another and also to the catheterization laboratory personnel. In patients who are seropositive proper precautions should be taken and the entire material used for cardiac catheterization should be discarded.

The main study limitation is the relatively small size of the study and fact that follow-up sero-conversion was not looked at in those in whom resterilized catheters were used to see if any transmission has slipped past the safety net employed in this study strategy. Also, this is a single center study and may not reflect the situation in other areas of the country. However, as a pilot study, the data generated are important for the interim period recommendations until more definitive data are available from a larger & multi-center study which can be planned based on hypotheses generated by this pilot study.

CONCLUSION:

1. The frequency of hepatitis B, C and HIV in patients undergoing PTMC is 14% & 8% is as compared to general population figures of 2.56% for HBsAg & 5.31% for anti-HCV respectively.
2. As we are developing country and we have to reuse multi-track balloon catheters because of cost issues. Therefore, screening of HBV, HCV and HIV is mandatory before undergoing PTMC to avoid cross infections. Balloon and other material used in seropositive patients should be discarded.
3. National guidelines regarding reuse of various hardware and other preventive measures are needed for patient's safety. Recommendations that we can make from this pilot study are:-
 - * It would be more efficient, cost effective and safer if a decision about which, if any, of the medical devices recommended for single use are suitable for reuse in our circumstances.
 - * A full and accurate cost analysis should be carried out before considering reuse of

individual items because of the many hidden costs e.g., it may be cost affective to reuse electro physiology catheters, but not diathermy pencils.

- * On-going quality assurance studies and research should be undertaken to accurately determine the risks associated with reuse.
- * Patients should be informed about reuse its risks and safety precautions taken and consent obtained.
- * Strict guidelines at a National level should be evolved to ensure adherence to cleaning and sterilization standards alongwith continuous quality control.

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