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HIV SEROPOSITIVITY IN PATIENTS WITH INFECTIONS REQUIRING SURGICAL INTERVENTIONS AND THE EXTENT TO WHICH UNIVERSAL WORK PRECAUTIONS ARE FOLLOWED WHILE TREATING PATIENTS

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ABSTRACT: BACKGROUND: This study is an attempt to assess the prevalence of HIV seropositivity in a specific infective surgical population a step towards estimating the risk of professionally acquired infection, and to assess the extent to which universal work precautions are actually applied in this hospital. Such a study is necessary before recommendations can be made regarding the advisability of HIV testing and steps to be taken to strengthen universal precautions. **MATERIALS AND METHODS:** The patients were selected from surgical emergencies and wards. Testing for HIV seropositivity was done at the ICTC in BTGH working under Karnataka State AIDS Protection Society (KSAPS). All patients attending surgical OPDs and surgical emergencies, or admitted in surgical wards, who had infections requiring surgical intervention were considered for inclusion in the study. Patients with infections secondary to trauma (accidental or surgical) one hundred patients thus selected were included in the study. **RESULTS:** Of the 100 samples tested, 2 were found to be reactive for anti-HIV antibodies, thus giving a HIV seropositivity rate of 20 per thousand. There is a low level of compliance with Universal Blood and Body Fluid Precautions combined with a fairly low risk perception in an unacceptably high number of health-care personnel. The high prevalence of HIV seropositivity in the general group of patients who attended BTGH without surgical infections indicates that in the future increasing numbers of HIV seropositive patients with infections requiring surgical intervention are likely to present for treatment. **CONCLUSION:** The following conclusions can be made from the study; 1. The prevalence of HIV seropositivity among patients with infections requiring surgical intervention was 20 per thousand. 2. Inadequate supply of protective materials is a factor in the poor compliance of Universal Precautions.

KEYWORDS: HIV Seropositivity, HIV Chemoprophylaxis.

INTRODUCTION: Since its beginning in 1981, the AIDS epidemic, as it has come to be called, has become a major challenge, to the whole of mankind in general and to the medical profession in particular. This epidemic has had a vast effect on most spheres of human activity, affecting patterns of social and sexual behaviour, and changing the way the health care is provided all over the world. It has 'created an industry of immense proportions, stimulated the passage of complex legislations, uncovered many ethical dilemmas, taxed federal and state budgets, added enormous costs to the health care industry, and because of the phobia it creates, has turned various societal groups against one another.'¹ Initially a disease confirmed to high-risk groups, particularly homosexuals and intravenous drug abusers, it rapidly spread to the heterosexual population. While in Western countries the spread of HIV infection continues to be predominantly in high risk groups (homosexuals, intravenous drug abusers and certain ethnic minorities), in much of the third world, including Africa and most of South-East Asia, heterosexual contact is the predominant mode of transmission of HIV transmission.² In India

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the rate of HIV infection in 1998 was 4.18 per 100,000 population, with 6252 AIDS cases. In Bombay, HIV seropositivity rates among prostitutes was 51%, and was 35% among patients with sexually transmitted diseases, and as high as 4.2% in women attending one antenatal clinic.² WHO has estimated that in comparison to Africa where HIV infection peaked in 1995, infection in Asia will continue to increase well into the twenty-first century. The magnitude of the problem of HIV infection in India is clearly enormous.

The challenge that HIV infection put before the medical profession is two-fold; firstly in terms of a new constellation of disease entities with their constituent morbidity and mortality; and secondly because of the direct risk of transmission of infection that it presents to the providers of health-care. Due to the nature of their profession health-care personnel are exposed to the blood and body fluids of patients.³ Surgeons are at high risk of HIV infection, because they are exposed to blood and other fluids routinely in the course of operating, and because of the risk of intraoperative injury by sharp instruments.⁴ A major pre-occupation with surgeons dealing with potentially HIV infected patients revolves around ways to minimize the risk of professionally acquired infection. At present there are two strategies which are used; regarding the first one, application of Universal Blood and Body Fluid Precautions, also known as Universal Work Precautions, during the management of all patients, there is no controversy, and all authorities are agreed that they should be followed. The feasibility of actually applying these precautions universally is uncertain, and many authors have documented that such precautions are not rigorously followed in many settings.^{5,6} The other strategy is pre-operative testing of all patients, and there is little agreement on the effectiveness of this approach, and much debate regarding its ethical aspects.^{7,8} This study is an attempt to assess the prevalence of HIV seropositivity in a specific surgical population as a step towards estimating the risk of professionally acquired infection, and to assess the extent to which universal precautions are actually applied in our hospital in Gulbarga. Such a study is necessary before recommendations can be made regarding the advisability of pre-operative HIV testing and steps to be taken to strengthen universal precautions.

MATERIALS AND METHODS: This study entitled “HIV seropositivity in patients with infections requiring surgical intervention and the extent to which universal work precautions are followed, while treating patients” was conducted in the Departments of Surgery, M.R Medical College and attached to Basaveshwar Teaching and General Hospital, Gulbarga from Dec 2009 to May 2011. The patients were selected from surgical emergencies and wards. Testing for HIV seropositivity was done at the ICTC in BTGH working under Karnataka State AIDS Protection Society (KSAPS).

PATIENT SELECTION:

Inclusion Criteria: All patients attending surgical OPDs and surgical emergencies, or admitted in surgical wards, who had infections requiring surgical intervention were considered for inclusion in the study. Some of the common presenting conditions were abscesses (occurring spontaneously and not secondary to injury or injection), ulcers requiring debridement and dressing, cellulitis and Fournier’s gangrene.

Exclusion Criteria:

- Patients with infections secondary to trauma (accidental or surgical).
- One hundred patients thus selected were included in the study.

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Testing: Testing for HIV seropositivity was done by anonymous unlinked testing. A sample of peripheral venous blood was reserved from a larger blood sample being taken for routine tests. In no case was testing for HIV seropositivity the primary reason for performing a venepuncture. Testing for HIV seropositivity was done at the ICTC in accordance with protocols recommended by the National AIDS Control Programme (NACO).

Estimation of Compliance with Universal Precautions: The extent to which universal work precautions are followed in Basaveshwar Teaching and General Hospital, Gulbarga was investigated by means of a self-administered and anonymously filled questionnaire which was distributed among and filled by doctors and nursing staff of various departments, including staff from wards, emergencies and operation theatres. Respondents were asked questions regarding practices followed by them concerning the use of gloves while doing various routine procedures which involved potential exposure to blood or other body fluids, use of mask and eye protection, use of impermeable plastic aprons for routine and non-routine tasks and use of protective footwear. Questions were also asked about their practices with regard to disposal of used needles and syringes. Those working in a surgical environment were asked questions regarding their practices during surgical operations. Finally, respondents were asked about how they perceived their own risk of acquiring HIV infection professionally, using a categorical scale ranging from 'absolutely none' to 'every possibility'.

OBSERVATIONS AND RESULTS: HIV Seropositivity in Patients with Infections Requiring Surgical Intervention: This part of the study was conducted on 100 patients with infections which were surgically managed who reported to the surgical emergencies and wards of Basaveshwar Teaching and General Hospital. Testing for HIV seropositivity was done by means of anonymous unlinked testing and the samples were subjected to serological testing in the ICTC in Basaveshwar Teaching and General Hospital in Gulbarga.

Of the 100 samples tested, 2 were found to be reactive for anti-HIV antibodies, thus giving a HIV seropositivity rate of 20 per thousand.

The Extent to which Universal Precautions are followed while treating Patients: The extent to which universal precautions are followed while treating patients was assessed by means of a questionnaire which was circulated among doctors and nursing staff in the emergency and general wards. The questionnaire was required to be anonymously filled. One hundred forms were distributed, of which 88 forms were returned filled. Six of these forms were rejected on grounds of being incompletely filled, and the remaining 82 forms were studied. Of the 82 forms, 45 were from resident doctors and 37 from staff nurses. Of the 45 doctors, 31 were from surgical specialities (General surgery, orthopaedics, ENT).

RESULTS:

Use of Gloves: Respondents were asked questions regarding the use of gloves in the following situations, as well as questions regarding use of double gloves and washing of hands after removal of gloves.

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	Never	Some	Often	Always	Reasons for non-compliance
Examining a patient?	8	20	12	0	
Taking a blood sample?	3	5	26	11	
Putting up an IV line?	8	28	42	14	
Giving an IV injection?	20	40	16	6	
Giving an IM injection?	51	20	9	2	
Doing dress?	0	0	15	30	
Suturing a CLW?	0	0	0	45	

Table 1: Do you wear gloves while

- Do you wear double gloves during major surgery? Yes --4 No --20 Sometimes—7.
- Do you wash your hands after taking off your gloves? Yes --13 No --9 Sometimes—9.

Thus whereas all respondents (doctors) reported use of gloves while suturing a wound, only 30 out of 45 (67%) replied 'always' while doing a dressing and 15 (33%) replied "often". 20 out of 82 (24%) respondents 'never' wore gloves to give an IV injection, whereas only 6 (7%) 'Always' wore gloves. 8 out of 82 (10%) never wore gloves to put up an IV line. Interestingly, 12 out of 45 (27%) doctors also reported wearing gloves to examine a patient 'often', which is unnecessary in the absence of broken skin or raw surfaces.

Only 11 out of 31(35%) doctors of surgical specialties 'sometimes' or 'always' wore double gloves during major surgery, and 22 out of 31(71%) reported washing their hands after removal of gloves.

Some of the common reasons given for non-compliance with glove use were: shortage of time while dealing with heavy patient loads, lack of awareness regarding necessity of use of gloves for minor procedures like IV injections and putting up IV lines; these reasons were given in most cases by nurses rather than doctors.

Use of Masks. The Following Questions were asked:

	Never	Some	Often	Always	Reasons for non-compliance
Examining a patient?	40	5	0	0	
Giving an IV injection?	80	2	0	0	
Giving an IM injection?	80	2	0	0	
Doing a dressing?	65	10	5	2	
Suturing a CLW?	20	3	5	3	
Injecting haemorrhoids?	5	8	5	2	
Surgery in minor OT?	0	8	3	20	
Surgery in main OT?	0	0	0	31	

Table 2: In which situations do you wear a mask?

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Whereas all respondents reported using a mask in the main OT and a majority (23 out of 31 answering 'often' or 'always') in the minor OT, a much smaller number answered 'sometimes' to 'always' for suturing a lacerated wound.

Use of an Impermeable Plastic Apron:

	Never	Some	Often	Always	Reasons for non-compliance
Examining a patient?	43	2	0	0	
Putting up an IV line?	78	4	0	0	
Doing a dressing?	42	3	0	0	
Doing a cut open?	29	2	0	0	
Surgery in minor OT?	0	5	18	8	
Surgery in routine main OT?	2	17	10	2	
Surgery in emergency main OT?	0	20	10	1	
Attending to trauma patients in casualty?	20	10	1	0	

Table 3: Do you wear a plastic apron while

Only 2 out of 31 (6%) doctors reported using a plastic apron while doing a venous cut open, whereas 26 out of 31 (84%) reported that they 'often' or 'always' used an apron in the minor operation theater. Only 2 out of 31 (6%) reported 'always' wearing a plastic apron in the routine main operation theater, while 17 (55%) answered 'sometimes', 10 (32%) answered 'often' and 2 (6%) answered 'never'. In the emergency operation theater 11 (35%) 'Often' or 'always' reported using an apron, while 20 (65%) 'Sometimes' wore one. No respondents 'always' wore an apron while attending to trauma patients in the casualty, while 20 (65%) 'Never' wore an apron and 11 (35%) answered 'sometimes' or 'often'. The most common reasons given for non-compliance with use of aprons was short supply of plastic aprons in the wards and routine and emergency operation theaters. 2 respondents reported not using aprons because it became uncomfortably hot using a plastic apron under a surgical gown.

Use of Protective Footwear:

	Never	Some	Often	Always	Reasons for non-compliance
Minor OT?	28	3	0	0	
Routine main OT?	29	2	0	0	
Emergency main OT?	5	11	10	5	
Urology OT?	0	2	8	10	
Emergency / casualty wards?	30	11	4	0	

Table-4: In which situation do you actually wear protective footwear to prevent contact of feet with blood and body fluids?

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Only a minority of respondents reported use of protective footwear in the minor operation theater, 3 out of 31 (10%) answering “sometimes”, and in the routine main operation theater 2 out of 31(6%) answering ‘sometimes’. In the emergency main operation theater, 11 out of 31(35%) answered ‘sometimes’, 8(26%) answered ‘often’ and 5 (16%) answered ‘always’. 15 out of 45(33%) reported ‘sometimes’ or ‘often’ using protective footwear in the emergency ward, while 30 out of 45 (67%) ‘Never’ did so. In most cases the reason given for non-compliance was non-availability of appropriate footwear, the exception being the urology operation theater, where protective boots are available. However, even in the urology operation theater only 50% of respondents reported ‘always’ using boots and 50% did so ‘sometimes’ or ‘often’.

Disposal of Needles and Syringes:

	Never	Some	Often	Always	Reasons for non-compliance
On the floor?	60	22	0	0	
In the bin under the patient's bed?	42	39	1	0	
In a bucket containing sodium hypochlorite?	6	23	48	5	
Put them in a puncture – resistant container?	37	15	17	15	

Table-5: How do you dispose of needles/syringes? Throw them

A large number of doctors and nurses continue to dispose of, used needles and syringes on the floor, 22 out of 82 (28%) replying ‘sometimes’. 40 out of 82 reported ‘sometimes’ or ‘often’ disposing of needles in the bin under the patients bed. Only 5 out of 82(6%) ‘Always’ threw needles on a bucket containing sodium hypochlorite solution, 28(34 %) ‘Often’ and 42(51 %) ‘Sometimes’. No respondents always disposed of needles in a puncture proof container, while 32 (45%) did so ‘sometimes’ or ‘often’. The reason cited for non-compliance with accepted procedures of disposal of needles in most cases was non-availability of the necessary equipment i.e. buckets containing sodium hypochlorite solution and puncture resistant containers in all wards, and in cases where sodium hypochlorite containing buckets were available in the ward, non-availability of such buckets within convenient reach of the patient's bed.

Practices during Surgery: The following questions were asked-do you use a Mayo's table for passing sharp instruments between the scrub nurse and the surgeon?

Yes --3 No --20 Sometimes –8

Do you or your assistants use their fingers to retract wound edges?

Yes--3 No--3 Sometimes—25.

A majority of surgical residents do not use a Mayo's table for passing sharp instruments between the scrub nurse and surgeon, 20 out of 31(65%) replying ‘no’ and 8 (26%) replying ‘sometimes’. 25 out of 31 (80%) reported ‘sometimes’ using their fingers to retract wound edges.

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Perception of Risk of Professionally Acquired HIV Infection:

- How do you perceive your risk of acquiring HIV infection professionally?
- Absolutely none 0.
- Slight possibility 20.
- Reasonable possibility 48.
- Every possibility 14.

A majority of respondents felt they had a reasonable possibility of acquiring HIV infection professionally (59%). 20 out of 82 felt they had a slight possibility and 14 (17%) felt that there was every possibility of acquiring HIV infection professionally.

DISCUSSION: The advent of the AIDS epidemic and the rapid rise of HIV seropositivity in the population of large parts of the world has led to far reaching changes in the practice of medicine. Surgeons in particular are concerned about certain aspects of HIV infection and AIDS, particularly issues relating to testing for HIV seropositivity and prevention of professionally acquired infection. The pros and cons of testing of surgical patients for HIV seropositivity continue to be debated; many surgeons believe that knowledge of a patients HIV status would allow them to take extra precautions during surgery and would thus confer some degree of protection from the risk of professionally acquired HIV infection; this is contested by most health-care authorities who do not encourage routine testing of HIV status of patients not clinically suspected to be HIV positive. Moreover, this is contrary to the spirit of Universal Blood and Body Fluid Precautions, which assumes that every patient must be treated as though he or she is carrying an infection that can be spread by contact with blood or body fluids.

The utility of knowing the HIV status of surgical patients lies in the possibility of using that knowledge for the assessment of risk of professionally acquired HIV infection, in addition to the other benefits of knowing the HIV infection status of an individual patient, such as modification of a surgical procedure in the light of the patients HIV status and addition to his or her medical therapy of anti-retroviral and other drugs intended for the prophylaxis of infections known to occur in HIV positive patients (For example anti-tubercular therapy or pneumocystis carinii pneumonia prophylaxis). Many infections requiring surgical intervention have been shown to occur with increased frequency in patients with HIV infection however few studies have assessed the prevalence of HIV infection in the population of patients with infections requiring surgical intervention.

The present study was conducted in the department of Surgery in M.R Medical College and associated Basaveshwar Teaching and General Hospital, Gulbarga. 100 patients with infections that were surgically treated were tested for HIV seropositivity by means of anonymous unlinked testing, out of which 2 were found to be seropositive for HIV infection, giving a prevalence of 20 per thousand individuals in the tested population. This figure was compared with the total number of persons tested who were attending various other specialities in BTGH without surgical infection in ICTC during the study period i.e., DEC2009 to MAY2011. The HIV seropositivity rate for the period corresponding to the study was 117 HIV positive individuals out of 3960 tested, a prevalence of 29.5 per thousand. However, keeping in mind that the median time for progression of HIV infection from seroconversion to immunodeficiency and clinical AIDS is about 10 years, it is reasonable to assume that HIV infected persons who are now beginning to manifest with infections belong to that segment of the population

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that acquired HIV infection about a decade ago; thus the prevalence of HIV infection in the group studied (20 per thousand) when compared to the prevalence of HIV infection in general population attending to the hospital without surgical infections (29.5 per thousand), it can be anticipated that over the next decade an increasing number of patients with HIV related clinical disease, including those with infections requiring surgical intervention will be encountered.

The next part of the study, the survey of the extent to which universal precautions are followed while treating patients, revealed an unacceptably low level of compliance with Universal Blood and Body Fluid Precautions. In most cases the respondents demonstrated poor compliance with basic precautions like glove use while performing any procedure with potential spillage of blood and body fluids, use of protective devices like masks, plastic aprons and protective footwear during surgical procedures. Thus it was seen that while putting up an IV line, only 14 out of 82 doctors and nurses (17%) 'Always' used gloves; 28 (35%) used gloves 'sometimes' and 8 (10%) 'Never' used gloves. Interestingly, 32 out of 45 doctors (71%) reported using gloves 'sometimes' or 'often' while examining a patient, which is unnecessary in patients without broken skin or raw surfaces, thus demonstrating a poor understanding of the mode of transmission of HIV. A minority of surgeons reported 'often' or 'always' using a plastic apron while operating in main operation theatres (Routine or emergency); in most cases the reason cited was poor availability of aprons. Two reported not using a plastic apron because it became uncomfortably hot while using a plastic apron under a surgical gown.

The use of protective footwear for protection of feet from splashes of blood during surgery was similarly very low, with no surgeons reporting using protective boots 'often' or 'always' in the routine main operation theatre and only about half (15 out of 31) reporting its use 'often' or 'always' in the emergency main operation theatre. The reason given for non-compliance by most respondents was non-availability of such footwear. The only situation where protective footwear was used by a majority 'always' or 'often' was (18 out of 20) was in the urology operation theatre where boots are supplied.

Compliance with disposal of used needles and syringes was also poor, with a little more than half of doctors and nurses disposing of used needles in a bucket containing sodium hypochlorite 'often' or 'always', and less than half using a puncture proof container. Reasons given for non-compliance were non availability of the means of disposal, and also lack of the buckets and containers in proximity to the patients' beds.

With regard to techniques for minimizing the risk of injury during surgery, a majority of surgeons did not use a Mayo's table for passing sharp instruments between the scrub nurse and surgeon. A majority of surgeons continue to use fingers to retract the edges of wounds while operating.

All respondents had some perception of risk of acquiring HIV infection professionally; more than half felt that there was a reasonable possibility of acquiring infection, while about a quarter felt that there was a slight possibility and the remainder felt there was every possibility. It is significant that nearly a quarter of health care personnel still feel that the likelihood of professionally acquired infection is slight; these individuals could form the focus of educational efforts to promote awareness of the risks of professionally acquired HIV infection and the importance of complying with universal precautions.

The survey for assessment of compliance with Universal Blood and Body Fluid Precautions revealed a generally low level of compliance with most recommended procedures. Whereas in some cases lack of protective materials was cited as a reason for non-compliance, lack of knowledge regarding precautions was not given as a reason in most cases. Thus the scenario that emerges is one of low compliance in the presence of awareness regarding Universal Blood and Body Fluid Precautions,

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despite a perception of risk. This picture coupled with the prevalence of HIV seropositivity in a subset of the surgical population (those with infections requiring surgical intervention), and a trend that indicates an increasing prevalence and a high likelihood of increasing numbers of patients presenting with such infections, indicates the need for reinforcement of the necessity of following universal precautions through education of health workers, as well as an improved supply in the workplace of the materials necessary for the implementation of Universal Blood and Body Fluid Precautions.

SUMMARY AND CONCLUSIONS: This study of HIV seropositivity in patients with infections requiring surgical intervention was conducted in the Departments of Surgery in M.R. Medical College and associated Basaveshwar Teaching and General Hospital. 100 patients with infections which required surgical intervention were tested for HIV seropositivity using unlinked anonymous testing. The assessment of the extent to which Universal Blood and Body Fluid Precautions are followed in the management of patients was done by means of a questionnaire which was distributed among doctors and nurses in the general and emergency wards of Basaveshwar Teaching and General Hospital.

LIST OF ABBREVIATIONS:

AIDS:	Acquired immunodeficiency syndrome.
HIV:	Human Immunodeficiency Virus.
WHO:	World Health Organisation.
ICTC:	Integrated Counselling and Training Centre.
KSAPS:	Karnataka State Aids Protection Society.
NACO:	National Aids Control Organisation.
BTGH:	Basaveshwar Teaching and General Hospital.
HCP:	Health Care Personnel.
PEP:	Post Exposure Prophylaxis.
HBV:	Hepatitis B Virus.
HCV:	Hepatitis C Virus.
ART:	Anti-Retroviral Therapy.
LPV:	Lopinavir.
NLF:	Nelfinavir.
IND:	Indinavir.
EFV:	Efavirenz.
FDC:	Fixed Dose Combination.
CDC:	Centre for Disease Control.
ED:	Emergency Department.

The following conclusions can be made from the study:

1. The prevalence of HIV seropositivity among patients with infections requiring surgical intervention was 20 per thousand.
2. The high prevalence of HIV seropositivity in the general group of patients who attended BTGH without surgical infections indicates that in the future increasing numbers of HIV seropositive patients with infections requiring surgical intervention are likely to present for treatment.
3. There is a low level of compliance with Universal Blood and Body Fluid Precautions combined with a fairly low risk perception in an unacceptably high number of health-care personnel.

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4. Inadequate supply of protective materials is a factor in the poor compliance with Universal Precautions.

Based on these conclusions, the following recommendations for strengthening compliance with Universal Blood and Body Fluid Precautions may be made:

- An education programme for both doctors and nurses to reinforce the importance of compliance with Universal Precautions.
- Better supply of all types of protective barrier materials with special emphasis on plastic aprons and protective footwear.

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