

The Orthopaedic Surgeon and HIV in Jamaica

Abstract

The Caribbean has one of the higher prevalence rates of HIV in the world. Many HIV patients present to the Orthopaedic surgeon as a trauma victim. Trauma continues to be very prevalent as a result of interpersonal violence and motor vehicle accidents. This continues to drain the health budget, deplete blood banks and cause cancellations on elective lists. Orthopaedic surgeons continue to be at risk because a large percentage of their patients present with trauma. Factors affecting cumulative risk include the HIV prevalence in the practising community, the prevalence of trauma nearby communities, the nature and length of surgery as well as adherence to universal precautions.

Keywords: HIV; Orthopaedic Surgeon; Transfer; Jamaica

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Abbreviations: HIV: Human Immunodeficiency Virus; AIDS: Acquired Immunodeficiency Syndrome; RNA: Ribonucleic Acid; DNA: Deoxyribonucleic Acid; CD: Cluster of Differentiation; STI: Sexually Transmitted Infections

Introduction

The Caribbean has been reported as having an estimated 250,000 persons living with HIV in 2009 [1]. In Jamaica, among adults 15-49 years, the prevalence rate at the end of 2009 was estimated to be 1.7%. Access to anti-retroviral drugs has slowed the mother to child transmission and reduced the prevalence of HIV. Now there are more persons living with HIV, than dying from it. Estimates vary, but the number of persons living with HIV in Jamaica, in 2009, was 32,000 and persons dying from AIDS for the same year were 1200 [1].

The Orthopaedic surgeon comes into contact with individuals suffering from HIV mainly via the route of trauma [2]. Interpersonal violence has been shown to be the chief cause of trauma and dominates the admissions in the emergency rooms of hospitals in Jamaica. In 2007, a study, carried out by the Ministry of Health Jamaica with the Pan American Health Organisation determined that treating violence in the major hospitals consumed about 40% of the recurrent budget of the hospitals as well as displacing scheduled elective surgeries with emergencies.

Occupational infection with HIV is a potential tragedy, physically, psychologically, socially and professionally. HIV is known to be transported via blood and certain body fluids [3]. Surgeons therefore have numerous encounters with blood borne pathogens in the Accident and Emergency Department, the ward and in the operating theatre when using sharp instruments. HIV has been isolated from different tissues and organs. Once body fluids contain even microscopic traces of blood, it is a potential source of infection [4].

Even though the literature suggests that occupational risk of HIV transmission is low [3], the consequences of acquiring HIV can be devastating. It is therefore important to revisit the HIV infectious guidelines since compliance in Jamaican hospitals are often not rigidly adhered to.

Discussion

HIV is a retrovirus which encodes its genome in RNA. The genome copies are transcribed in the DNA using the enzyme reverse transcriptase [5]. The site of transcription in the host occurs in CD4 cells, and it is this fall in the CD4 cell count that characterizes HIV [5,6].

The natural history of HIV has three stages:

- i. The acute stage - lasts 2-6 weeks after inoculation. The patient is sero-negative but the blood has high contaminating potential.
- ii. The chronic asymptomatic phase - lasts several years and during this phase HIV antibodies develop.
- iii. The third stage is AIDS - in which there are clinical manifestations and the potential for contamination is much greater than in the chronic, asymptomatic phase [4].

By 2013, the national HIV/STI programme in Jamaica estimated that 30,313 persons were living with HIV; but approximately 28% are unaware of their status. Between January 1982 and December 2013, thirty-one thousand eight hundred and ninety-eight (31,898) cases of HIV were reported to the Ministry of Health. Of these 31,898 persons, 9,056 (28.4%) were said to be deceased.

Understanding the modes of transmission to the Orthopaedic surgeon is important in determining effective means in preventing occupational transmission of pathogens [7-9]. Available evidence suggests that occupational risk of HIV transmission is low [4,10]. However, there is the view that there is underreporting [4,11]. The principal reason for underreporting is suggested to be the perceived low risk of transmission by staff. Elmiyeh et al. [12] noted that 78% of staff was aware of the reporting policy, but 61% thought that early reporting would primarily benefit the patient.

Factors placing the surgeon at high risk of HIV following percutaneous exposure, include deep injuries from a needle stick or sharp objects, visible blood on the device, procedures involving direct placement of a needle into a vein or artery, dealing with terminally ill HIV infected patients and where post exposure

prophylaxis has not been taken [13-15]. The risk to the surgeon is increased when the viral load is increased; that is, during later stages (uncontrolled AIDS).

Factors placing the surgeon at intermediate risk include less severe percutaneous exposure, mucous membrane or noncontact skin including a major splash or exposure greater than one minute [13]. Low risk is due to exposure to a small volume or minute muco-cutaneous exposure to body fluid other than blood (after a single exposure), low prevalence of HIV infection in the patient population, low rate of exposure per surgical procedure and the number of procedures performed throughout a surgical career [9,13]. Orthopaedic surgeons practicing in areas with high HIV prevalence may expect up to 7% of their patients undergoing emergency procedures and 1-3% of elective surgery patients to be HIV positive [4,16]. The lifetime risk varies between 0.01% and 12% depending on the location of the Orthopaedic institution and the type of surgeries performed.

Life time risk is defined as a surgeon's cumulative risk of HIV seroconversion over an entire surgical career [9]. Behrens et al. [17] noticed that the rates in his trauma patients were lower than in similar studies. He suggested that his lower figures may be reflective of a low prevalence in his geographical region. Later studies showed that HIV was found in significant numbers in trauma victims [4,8]. Quebbeman EJ [8] also noted that trauma surgeons were more likely than other physicians to come in contact with patients harbouring the virus and were least likely to identify seropositive patients prior to treating them. Additional precautions by trauma surgeons were recommended [8]. This data is particularly important in the Jamaican context as there is a high trauma burden throughout the island which drains precious resources on the Government budget, depletes the blood bank and causes numerous cancellations of patients on an Orthopaedic list. The author sees numerous trauma victims daily as a result of interpersonal violence. In addition to this, a high percentage of admissions are as a result of motor vehicle accidents because the hospital is located off a major highway in the country. Many have stated that preoperative screening has not been found to be cost-effective and that universal precautions should be applied to every surgical procedure [4,10,13]. The Ministry of Health in Jamaica has however mandated that all elective patients be screened for HIV in order to have an accurate HIV registry which may help to propose various guidelines.

Studies have often indicated poor compliance with universal precautions [9,12,18]. Routine use of standard precautions is not widely practiced because several surgeons do not perceive the risks to which they are exposed are great enough to warrant this [19]. This is not the case when the patient is deemed to be high risk. Knowledge of the patient's status does not influence the rate of exposure [20]. Various HIV infection guidelines, principally define universal precautions as routine wearing of gloves, masks, gowns, goggles and boots for procedures where splashing of blood or contact with body fluids is expected. Double gloving and waterproof aprons are recommended to prevent splattering blood and body fluids from making contact with the surgeons body [11].

The aim of standard precautions is to prevent contact with blood and other body fluids, excretions, secretions, non-intact skin and mucus membranes of all patients [4,13]. Appropriate

protective draping and garments made of non-woven impervious materials are required to provide an effective barrier between the patient and the surgical team. The likelihood of body contamination increases as the blood loss or surgical time increases [20-23]. Techniques to reduce surgical time for example using bone graft substitutes instead of autologous iliac crest grafting is a consideration [24].

There are some surgical rules aimed at protecting the surgeon such as avoidance of passing sharp instruments between team members, using no touch techniques, passing sharps in a basin, using a scalpel for skin incisions only then using scissors and electrocautery afterwards [4,9,24]. Avoid simultaneous suturing of the same layer by two members of the same team. Avoid hasty gestures and do not use hands as retractors.

Glove perforation is a frequent and often unrecognized occurrence by a surgeon during an operation [24]. Ersozlu et al. [25] noted that 72-79% of glove punctures went unnoticed intraoperatively. In that study, the most common site of perforation was the right thumb, followed by the left index finger. Laine & Aarnio [23] found that the index and thumb of the non dominant hand were the commonest sites. Surgeons have higher perforation rates than assistants and nurses [23,25]. Laine & Aarnio [23] found a thirteen fold decreased risk of blood contamination when using double gloves. Despite this, many surgeons do not double glove, citing decreased sensation and discomfort as a reason [26]. Length of procedure is a factor, with procedures lasting more than an hour yielding higher perforation rates.

It is recommended that if a 'sharp' injury occurs during surgery, the surgeon should stop operating as soon as possible, remove gloves, wash area with large volumes of soap and water or surgical detergent; the wound is encouraged to bleed then covered with a sterile dressing [8,15]. Apart from potential transfer between patient and surgeon, knowledge of the HIV status of the patient is important. The infection rate of open fractures in HIV-positive patients may be as high as 42% [27]. Late peri-implant infections post trauma surgery has also been reported in HIV-positive patients [28]. Early outcomes of providing antiretroviral medications in HIV-positive patients with a low CD4 count have been shown to be effective in decreasing the risks to the same level as HIV-negative patients. A South African study had a prevalence rate of 23% of their Orthopaedic trauma patients testing positive for HIV. They noted that in order to improve treatment outcomes it is important to know the HIV status of Orthopaedic trauma patients in order to be able to offer early antiretroviral and prolonged prophylactic antibiotic treatment in those who are HIV-positive and have a low CD4 count [29]. Aguocha et al. [30] found that 9.3 % of his Orthopaedic patients tested positively for HIV. He noted that there is a safety concern for health workers especially surgeons in developing countries because of suboptimal conditions. The highest prevalence rate was in the 30-49 year old age group and this group generally has a large percentage of trauma victims. He recommended routine screening of HIV (as is now practiced in Jamaica) adopting universal precautions routinely and that hospitals must offer counseling for HIV victims [30]. The HIV/STI programme in Jamaica reported in 2013 stated that the introduction of public access to antiretroviral treatment in 2004, and the use of rapid test kits which allow for earlier diagnosis, availability of prophylaxis against opportunistic infections and

improved laboratory capacity to conduct investigations such as CD4 counts, viral load and PCR tests are believed to have contributed to the decrease in deaths.

Conclusion

Infection with blood borne pathogens has long been recognized as an occupational risk for health care workers. Orthopaedic surgeons are particularly at risk. There is an abundance of evidence that simple work practices and adherence to guidelines will help in preventing work related transmission. Screening for HIV in high prevalence regions allow for earlier detection, intervention and improved patient outcomes. It is critical that protocols are produced by institutions and adhered to by all.

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