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Formulating an effective exposure control plan to deal with needlestick injuries in a free-standing surgical centre

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Needlestick injuries involving healthcare workers are not uncommon complications of surgical procedures. While much has been written about ways of addressing concerns of human immunodeficiency virus (HIV) and hepatitis B (HBV) infections in hospital settings, issues of significant exposures in an ambulatory surgical centre can present unique problems. In addition, regulations within a particular community may limit choices of protocol. A protocol is outlined in this article which maintains both patient and healthcare worker confidentiality, while answering questions that can relieve the anxiety associated with a significant exposure.

Key words: HIV, significant exposure, employee exposure, hepatitis B infections, universal precautions, ambulatory surgery exposure

One of the most anxiety producing problems facing a medical director in a modern outpatient surgical facility is the employee who has been stuck by a contaminated needle. The healthcare worker is faced with concerns about personal well-being and risks to family and friends that may not be answered for months. A medical director must balance the need to help his staff grapple with these issues and the personal privacy rights of his patients. While laws protecting patients and employees vary from country to country, this article will attempt to address the concerns of employees and the rights of patients in a systematic manner. Specifically, human immunodeficiency virus (HIV) and hepatitis B (HBV) infectious risks will be examined as they relate to needlestick incidents in a busy outpatient surgical practice.

Prevention

The most important method of preventing HIV and hepatitis B infections is to prevent them from ever happening. To this end, we have adopted universal precautions as outlined by the Centers for Disease Control (CDC) for all aspects of patient care in our facilities[1]. In addition, all our employees have been offered and have accepted HBV vaccine prophylaxis.

The CDC recommends that certain blood and body fluids of all patients should be considered potentially infectious[1]. The term associated with the concept known as 'universal precautions' is used in reference to the management of all patients rather than all body fluids. Prevention of transmission of bloodborne pathogens is the ultimate purpose and goal of this technique. Those high-risk areas of concern apply to blood, blood-tinged fluids, semen, vaginal secretions, tissue, cerebrospinal fluid and synovial, pleural, peritoneal, pericardial and amniotic fluids. It does not include saliva, tears, nasal secretions, sputum, sweat, urine, faeces or vomit (unless visible blood is noted).

Universal precautions must be integrated into each and every procedure within the perioperative setting. To this end policies and procedures are formulated with the incorporation of universal precautions. All members of the health team are provided, at no cost to them, the necessary types of personal protective equipment for their respective jobs, in line with universal precautions. These items include protective eyewear, gloves, impervious operating-room attire, shoe, face and hair covers. Mandatory use of this protective equipment is the policy of our facility. Signs are posted throughout the facility as a constant reminder to all staff members to protect themselves and their patients. A mandatory inservice review by the Medical Director and the Nursing Director is provided to employees on an annual basis in order to review and update each individual staff member on Occupational Safety and Health Administration (OSHA) standards and universal precautions. In addition to our inservice programme we implement prevention techniques within the facility.

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They include the following:

1. A needleless system for iv therapy.
2. Ongoing communication among the perioperative team in order to implement individual patient care plans for the surgical procedure.
3. The importance of 'well choreographed movement' or being aware of your relationship to your immediate surroundings within the surgical setting, to avoid motions that may lead to unnecessary exposure.
4. The storage and placement of sharps (i.e. needles, surgical blades, etc.).
5. Correct fit of surgical gloves to avoid protrusion of fingertips which could be a potential interference in performance.
6. The use of forceps or needle holders to make adjustments to atraumatic needles, sutures or scalpel blades.
7. The proper use of instruments rather than the implementation of fingers to stabilize or retract tissue.
8. The use of the intermediate tray technique for passing sharps about the sterile field.
9. Not recapping, bending or breaking any needles prior to proper disposal.
10. Employing safety techniques in the decontamination area, i.e. specially designed processing gloves and a colander system to avoid immersing hands blindly into contaminated instruments sets.
11. Implementing capping techniques for all exposed intraoperative sharps, i.e. K-wires, external fixation devices, etc.

Developing a protocol

Despite these preventative measures and a careful staff, accidents occur on an infrequent basis and needlestick incidents must be addressed. Our first step is to reassure the employee that the risk of HIV infection is very low. In a recent study 0.36% of healthcare workers stuck with a needle from a known AIDS patient converted to being HIV positive[2]. Other studies of needlestick injuries suggest that the risk of seroconverting may be modified by several factors. For instance, blood volume transferred to a patient may be decreased more than 50% when the needle passes through a single latex or vinyl glove and double gloving may afford added protection[3]. Depth of needle puncture into the skin, the type of needle used (hollow bore vs. solid), size of inoculum and clinical stage of the patient's HIV infection may also modify risk factors in the setting of a needlestick injury[4]. Although the risk of HBV may be more than 10 times higher[5,6], all of our employees have received a complete series of the HBV vaccine. Their risk of infection is low as long as they have seroconverted.

Our next step is to assess the potential risk of HBV and HIV infection from the particular patient, We do not routinely screen for these infections preoperatively for several reasons. First we feel that the cost is prohibitively expensive. Each enzyme-linked immunosorbent assay (ELISA) screening test for HIV antibodies costs approximately $42. Since we perform over 3000 cases a year at our facility alone, it would cost over $120 000 just to test for HIV infections. In addition, it would create a false sense of security among employees who might not follow universal precautions with as much diligence. Patients who are in the window of infectivity might test negative for HIV antibodies while carrying the virus[7]. If the patient is known to be high-risk on the basis of history (iv drug use etc.), the employee is counselled on the advisability of undergoing prophylactic AZT therapy or HBV immunoglobulin therapy. On the basis of recent studies on the effectiveness of prophylactic AZT therapy coupled with side effects of the drug and the low incidence of seroconversion even if the patient is HIV positive, employees are advised against undergoing immediate AZT treatment[8]. However, in this case or in the case of a low-risk patient, the healthcare worker has the option of undergoing this treatment at the expense of the centre. None of our employees has chosen this option yet.

At this point in the counselling the employee is asked whether or not he or she wishes to pursue the additional testing opportunities available. For protocol purposes relative to future compensation concerns, the healthcare worker is strongly encouraged to follow up on obtaining antibody levels. If the employee agrees to testing, an HIV (enzyme immunoassay) test, HBV surface antigen, HBV surface antibody and HBV core antigen are obtained.

Next the patient is informed of the contaminated needlestick incident. The patient is reassured that there is no danger to them but that considerable anxiety has been created for the healthcare provider who has cared for them. They are then asked to provide a blood sample for the testing of HIV antibodies and HBV antibodies and antigens. Since most of our patients have received sedation, they cannot give informed consent for the performance of HIV testing during their same-day stay in the ambulatory surgical centre. Connecticut law and the law of many states requires the obtaining of an elaborate informed consent covering the reasons and implications for AIDS testing[9]. If the patient agrees to testing, the HBV screen is performed and the HIV test is run the following day after appropriate informed consent is obtained from the patient. Alternatively, blood for both HIV and HBV tests can be drawn on the day of surgery and a telephone consent for the HIV test can be obtained on the day after surgery. This latter option will be discussed further on in this paper.

Connecticut law realizes that the need may arise for a court order forcing a patient, who refuses voluntarily to undergo HIV testing, to be tested if a healthcare worker suffers exposure to a needle contaminated with that patient's blood. Since the law came into effect, however, we have had only five significant exposures and all patients have voluntarily undergone HIV testing. The law has been challenged in another ambulatory centre

in Connecticut and a court order was obtained to compel the patient to undergo HIV testing. In order to qualify for a court order, the affected employee must first agree to be tested and be found HIV negative.

All testing of employees and patients is done anonymously. The initials and date of birth of those to be tested are included on the requisition form. The results of the test are placed in a separate, confidential file and are not released to anyone other than the employee and patient. The test results are received, reviewed and filed by both the Medical Director and the Administrative Director who would inform the healthcare worker of the test results. Since the needlestick events discussed here do not put the patient at risk, we do not inform the patient of the healthcare worker's HIV status. The tests are paid for entirely by the surgical centre and no cost is incurred by patient or employee.

Of the five employees stuck by needles over a period of 36 months, none has been exposed to an HIV-antibody-positive patient. If patients had been positive, repeat tests on the healthcare worker would have been performed at 3 month intervals for a year, since there may be a delay in the appearance of antibodies for many months after a clinical infection[7]. Even if the results of the patient are negative for HIV, the healthcare worker has the option of having HIV testing every 3 months for 1 yr. All employees are counselled on the meaning of positive test results. All positive tests are confirmed by Western blot test for HIV antibodies. Employees with confirmed positive tests are given the option of treatment with AZT.

Interestingly, one of the five employees was exposed to a HBV carrier. Although this employee had received the HBV vaccine series and had shown evidence of seroconversion 2 yr before, her level of antibody was considered low at the time of her needlestick injury. She elected to undergo HBV immunoglobulin therapy at the recommendation of our consulting infectious disease physician. Current recommendations call for 0.06 ml kg^{-1} of HBV immunoglobulin (HBIG) to be given within 1 week of the needlestick injury and a repeat dose of 0.06 ml kg^{-1} HBIG to be administered within the next 7 days[10]. She also underwent a repeat series of HBV vaccine. She did not develop the virus after the known incubation period.

The patient who was a HBV antigen carrier was known to us prior to surgery. The knowledge of the patient's carrier status allowed us to address the exposure implications quickly to our employee. Most patients do not have a current assessment of HIV or HBV status and a means of obtaining this information quickly must be devised.

Special problems encountered in an ambulatory setting

There are some unique problems which may be encountered in obtaining informed consent in an outpatient surgical centre that are not found in the inpatient surgical population. First a greater percentage of patients are young and healthy and return to family and employment commitments as soon as a day after their surgery. As a result, it may be difficult to convince these individuals to return to the outpatient centre for a test which may not directly benefit them. Fortunately, when presented with the anxiety faced by a healthcare employee over a contaminated needlestick, to date all patients who have been involved in a significant exposure incident have returned for testing on the day following surgery.

The second problem concerns issues of informed consent in the recently anaesthetized patient. Since in most states informed consent must be obtained before an HIV test is performed, a patient must return the day following surgery to be briefed on the implications of this test. We initially delayed drawing a blood specimen until the following day, but have now simplified the process. We now draw a HBV screen on the day of exposure, which can be legally obtained without informed consent. In addition, we draw a second specimen of blood for possible HIV testing. This eliminates the need to have the patient return to have blood drawn on the day following surgery. We allow the patient to give witnessed verbal telephone consent for HIV testing on the day following surgery so that he or she does not have to be physically present. In the event a court order is needed for a patient who refuses testing, a vial of blood which can easily be tested for HIV, pending judicial approval is in the possession of the centre.

Patient confidentiality

Many patients are concerned that positive HIV information may be disclosed to their employer or insurance company. They may justifiably fear loss of work or employment benefits. We have addressed this anxiety by labelling all HIV tests in significant exposure situations anonymously. The patient or healthcare worker has only initials and date of birth attached to his or her sample of blood. When the results are returned to the centre, they are not included in the patient's or employee's encounter file, but are placed in a separate file maintained only for significant exposures. In this manner, a patient's confidentiality is maintained if an insurance company or employer subpoenas a copy of the chart; a situation which may occur in cases of litigation or worker's compensation.

In the event that HIV testing uncovers a patient who is antibody positive, we advise counselling for the exposed healthcare professional on the statistically small likelihood of conversion. We then recommend HIV testing in the employee for 1 yr at 3 month intervals. If an individual converts as a result of a needlestick injury, it is likely to occur during this period of time. The healthcare worker who has been exposed to an HIV-positive patient is offered immediate psychological counselling. Treatment options are discussed with employees who do convert to HIV-positive status. As discussed above, prophylactic options are offered to healthcare workers immediately following a significant exposure, but they are not encouraged since the results

of such studies are not promising and the side effects of AZT therapy are high.

Counselling the patient who has a positive antibody test is also challenging in the ambulatory surgical setting. Most of these individuals did not volunteer to be tested and many agree only reluctantly. When we contact the HIV-positive patient we inform them of the results of the test and its implications. We encourage them to come to the surgical centre for further counselling by the Medical Director. Patients are advised to consult with their family physician regarding follow-up therapy. If they do not have a personal physician, the name of an infectious disease physician is provided to them for further questions and potential treatment. Patients are assured that the results of their tests will remain confidential.

Conclusions

We have discussed some of the problems associated with incidents of significant exposure in the outpatient surgical setting. In dealing with this event, one must never underestimate the anxiety created for both patient and employee alike. However, if the simple protocol outlined in this article is followed, the patient's and the healthcare worker's confidentiality can be maintained and answers that can relieve your colleagues' fears can, in many cases, be provided. This plan will satisfy even the most stringent laws governing HIV testing which may be in place in your region. We strongly suggest, however, investigating the applicable regulations in effect in your community.

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