Perioperative Use of the Hands-Free Technique:
A Semistructured Interview Study

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Perioperative personnel who are involved in surgical procedures are exposed to a significant amount of blood and bloody fluids, which may be infected with hepatitis C, hepatitis B, or HIV. Surgical procedures require the use of many sharp instruments,[1] so OR personnel are at an increased risk of sustaining percutaneous injuries, glove tears, and skin and mucous membrane contamination.[2-8]

Many surgical practices and barriers have been proposed to lessen surgical risk of bloodborne pathogen transmission, but little evidence for their effectiveness exists because most have not been properly evaluated. There is good evidence, however, that using redesigned syringes with retractable needles,[9,10] using blunt-tipped suture needles to close tissue layers below the skin,[11,12] and wearing two pairs of gloves during surgery[13,14] can reduce the risk of percutaneous injury. There is also limited evidence that the hands-free technique (HFT) reduces a health care provider's risk of sharps injury and exposure to bloody fluids.[2]

When the HFT is used, instead of sharp items being passed directly between surgeons, residents, nurses, and other OR personnel, they are laid down in a designated "neutral" or "safe" zone and then retrieved as required (Table 1). This applies to passing scalpels and suture needles, other routinely identified sharp items, and items such as trocars, wires, and sharp bone fragments. Safe or neutral zones can consist of a section of the surgical field, a Mayo stand, a table, or a basin, depending on the size, type, and number of sharp items required during a surgical procedure.

Surgeons and nurses in the United States are gaining experience in implementing the HFT under the Occupational Safety and Health Administration's (OSHA's) standard titled *Occupational Exposure to Bloodborne Pathogens; Needlestick and Other Sharps Injuries*, which has been in place since 1991 and was further strengthened in 2001.[15] Implementing the HFT may reduce the risk of transmission of bloodborne pathogens, so OSHA has begun inspecting hospitals to assess whether the HFT is used routinely to pass sharp items during surgery.[16] The ability to implement the HFT in sections of the surgical field or potentially to use receptacles already present during surgery is a feature that makes use of the HFT particularly attractive.[17]

The primary purpose of the study reported below (ie, one phase of a three-phase study) was to explore the attitudes

ABSTRACT

- **OCCUPATIONALLY CONTRACTED bloodborne infections are preventable, but the use of many protective measures remains limited.**
- **THERE IS GROWING EVIDENCE that the use of the hands-free technique (HFT) to pass sharp items during surgical procedures is effective in protecting against sharps injury and bloody contamination.**
- **RESEARCHERS CONDUCTED in-depth telephone interviews to explore 20 health care providers' knowledge and use of the HFT.**
- **MOST OF THE INTERVIEWEES did not regularly use the HFT, and some were resistant to its use.** *AORN J* **84 (August 2006) 233-248. © AORN, Inc, 2006.**

TABLE 1
Comparison of Passing Techniques

Direct hand-to-hand passing	Passing using the hands-free technique
A sharp item is transferred from one person's hand to another person's hand.	A sharp item is placed on a "neutral zone" by one person and retrieved by another or the same person.
This requires a single action.	This requires two separate actions.

of Canadian and US surgeons, perioperative nurses, and surgical technologists regarding their use of the HFT. The research approach was qualitative; telephone interviews were conducted with perioperative personnel. During this phase, data also were collected regarding factors that prevent use of the HFT and suggestions were solicited on how to encourage use of the technique during surgical procedures.

LITERATURE REVIEW

The HFT, which is endorsed by many professional and occupational health organizations,[18-22] was shown to be effective in a prospective study of 3,765 surgical procedures that took place in an inner city hospital in the United States.[2] In that study, surgical procedures in which the HFT was used 75% to 100% of the time were compared to surgical procedures in which the HFT was used 50% of the time or less. Data were adjusted for differences in type of surgery, duration, emergency status, and other factors during the comparison. During procedures in which blood loss was 100 mL or more, use of the HFT 75% to 100% of the time resulted in 59% fewer injuries, glove tears, and contaminations (95% confidence interval; range 28% to 77%) when compared to procedures in which the HFT was used 50% of the time or less.[2]

In another randomized, controlled trial evaluating the HFT, use of the HFT did not result in a decrease in glove tears during cesarean sections,[23] but that study had several limitations that included

- randomizing at the level of the surgery,
- not randomizing 14% of eligible cases,
- not confirming compliance with the HFT,
- not providing information on the ability to fit sharp items in the trays allocated for use of the HFT,
- not providing information on the potential underreporting of injuries and contaminations, and
- missing data from 5% of cases.

Randomizing individual surgeries as well as implementing the HFT by using pass trays in intervention surgeries on a procedure-by-procedure basis was not the best method to evaluate the HFT's potential benefits. The study should have used cluster randomization to allocate HFT use to intervention hospitals.

METHODS

Our previous findings of the effectiveness of the HFT provided the impetus for a three-phase, ongoing research project designed to assess whether use of the HFT would reduce the risk of exposure to bloodborne pathogens. The study proposal was approved by the University of Western Ontario, London, Ontario, ethics committee.

PARTICIPANT SELECTION

Using purposeful sampling, we selected 20 health care providers for the study. Those chosen included 11 US and Canadian surgeons, eight perioperative nurses who circulated and scrubbed, and one surgical technologist. These participants represented a broad range of ages, specialties, and views on the use of the HFT. Recruitment was accomplished by e-mail using addresses obtained from the 2003 Canadian Medical Directory and the American College of Surgeons' Committee on Perioperative Care, as well as in person and through OR postings. One surgeon in the group of selected surgeons had previously contracted

We asked participants about their usual practice for passing sharp items. If a participant was familiar with the hands-free technique, we asked how he or she had learned about it.

hepatitis C through an occupational exposure and no longer performed surgical procedures.

Data Collection

One researcher and a research assistant held interviews during the summer and fall of 2003 and the spring of 2004. Interviews continued until we determined that thematic saturation was reached. The respondents signed and completed consent forms that were distributed by fax. These consent forms also were used to gather demographic information on the respondents (ie, age, specialty practiced, location of training, location of practice). We then scheduled semistructured telephone interviews with the respondents. Nineteen interviews were recorded and were transcribed by a research assistant who was supervised by the research team's medical anthropologist and the principal investigator. The 20th interview was conducted, recorded, and transcribed by a newly recruited medical anthropologist hired to complete data analysis and interpretation. Each interviewee who participated in the survey received an honorarium of $100 US or Canadian.

During each interview, we followed specific, established guidelines.[24,25] The study participants were asked a series of questions that were designed to prompt discussion of the issues of interest to the research team. These questions were general enough to allow for the discussion of individual experiences and to introduce new perspectives. From the review of the literature and a previous HFT study carried out by the principal investigator, one of the researchers and the principal investigator developed questions that were intended to elicit the expression of a broad spectrum of attitudes towards use of the HFT and other related issues.

We asked interviewees what surgical items they considered to be sharp and what their usual practice was for passing sharp items during surgery. Depending on the answers to these questions, we probed further to determine whether the respondent knew about or could define the HFT. If an interviewee was familiar with the technique, we asked how he or she had learned about it. If an interviewee responded that the HFT was used some of the time during the surgical procedures in which he or she participated, we also asked

- which surgical team member usually decided that it would be used,
- how implementation of the HFT was usually carried out,
- what factors identified by the respondent encouraged or discouraged HFT use,
- what suggestions the respondent had about how to increase HFT use,
- what his or her perception was of the risk of exposure to bloodborne pathogens, and
- whether the respondent routinely used other measures to reduce personal risk from passing and handling sharp items during surgery.

After the first two interviews, we confirmed that these questions were sufficient to solicit the desired variety of opinions and answers needed.

Data Analysis

The research assistant and principal investigator developed a coding strategy and carried out preliminary coding. Several interview texts then were coded independently by the research assistant and two of the researchers. We compared results to ensure consistency and resolved differences by consensus. We then coded the remaining texts. As coding proceeded, certain themes became evident—some based on frequency of occurrence and others by the level of emphasis in individual interviews. We developed codes and associated texts using QSR-N6 software.[26]

TABLE 2
Survey Respondents

Surgeons

Gender	Age	Subspecialty	Country
M	57	Cardiovascular surgery	USA
M	49	Gastrointestinal surgery	Canada
M	52	Gastrointestinal surgery	Canada
M	36	General surgery	Canada
M	43	General surgery	Canada
M	50	General surgery	USA
M	55	General surgery	Canada
M	54	Neurosurgery	USA
F	32	Obstetrics/gynecology	Canada
F	48	Orthopedic surgery	Canada
F	38	Urologic surgery	Canada

Nurses

Gender	Age	Subspecialty	Country
F	54	Cardiothoracic surgery	Canada
F	63	Cardiothoracic surgery	Canada
F	42	Nurse educator	Canada
F	51	Obstetrics/gynecology	Canada
F	42	Orthopedic surgery	Canada
F	43	Orthopedic surgery	Canada
F	43	Thoracic surgery	Canada
F	35	Vascular surgery	USA

Surgical technologist

Gender	Age	Subspecialty	Country
F	58	General surgery	USA

RESULTS

The perioperative nurses and the surgical technologist ranged in age from 35 years to 63 years, and they worked in a variety of subspecialties, as did the surgeons, who were between 32 years and 57 years of age (Table 2). We tabulated the results, which generally fell into seven areas of emphasis. These were

- knowledge and practice of the HFT,
- how respondents learned about the HFT,
- how a decision is made to use the HFT,
- how the HFT is implemented,
- barriers and facilitators to using the HFT,
- suggestions to increase use of the HFT, and
- respondents' use of any additional risk-reduction measures.

KNOWLEDGE AND PRACTICE OF THE HFT. All but one surgeon had some knowledge of the HFT, but two were uncertain of its exact definition. The definition of the HFT given by most of those interviewed included the use of a neutral zone and that no two people should be touching the same sharp instrument at the same time.

Four surgeons initially stated that they used the HFT most of the time during surgery. On further questioning, however, it was revealed that the surgeon who had contracted hepatitis C occupationally had not engaged in clinical practice for two years, and he reported using the technique much less when he was actively performing surgeries. Another surgeon reported always receiving sharp items directly and always returning them by dropping them on the neutral zone (ie, corresponding to a 50% use of the HFT). Of the 11 surgeons interviewed, only two actually used the HFT most of the time. One of these two surgeons practiced general surgery, and the other practiced orthopedics. They both reported that they sometimes forgot to use the HFT; and their actual use of the HFT depended on the type of surgery, space available for a neutral zone, expediency, convenience, and the people with whom they were working. One of the two surgeons said,

> *If for some reason I'm in a position where I can't simply pick [an instrument] up I can still ask them to hand it to me and just sort of open up the palm of my hand so that the blunt part of the instrument is laid in it.*

This surgeon added, however, that "there's never any reason why I can't pass the instrument in the basin."

Three surgeons reported rarely using the HFT, and another four reported using hand-to-hand passing exclusively. The surgeons who rarely used the HFT practiced neurosurgery, gynecology, and general surgery. Those surgeons who used hand-to-hand passing exclusively

practiced general surgery, gynecology, and cardiovascular surgery.

One nurse working in orthopedics reported using the HFT "all the time," whereas the other nurses reported inconsistent use. On further exploration, the nurse who initially reported always using the HFT, reported not using the HFT when assisting in spinal surgery because of the surgeons' use of microscopes. Three other nurses reported that they passed sharp items to surgeons hand-to-hand but always retrieved them from a neutral zone. Four nurses reported primarily passing and receiving sharp items hand-to-hand, stating they used the HFT "very infrequently," "occasionally," or "only when I'm not busy." One nurse reported not using the technique at all. The nurses who did not use the HFT regularly worked in orthopedics, cardiothoracic surgery, and vascular surgery, and one was a nurse educator.

Three nurses identified scalpels as the main sharp items passed in surgery, although they also included scissors, Kirschner wires, drill bits, needles, self-regulating suction drainage devices, rakes, and syringes on their list. Surgeons most often identified scalpels and straight and curved suture needles as sharps, and one surgeon included saw blades. Another said, "anything that's sharp and that could puncture the glove."

How respondents learned about the HFT. Surgeons and nurses reported learning about the HFT

- during their formal education;
- through professional organizations (eg, The American College of Surgeons' [ACS] Committee on Perioperative Care, AORN, The Operating Room Nurses Association of Canada [ORNAC], a local nurses' association);
- by attending conferences or hospital seminars given by infection control practitioners;
- from OR supervisors, other colleagues, and OSHA inspectors;
- by reading scientific journals;
- by watching medical equipment company videotapes; and
- by accessing the Exposure Prevention Information Network (ie, EPInet) web site, which is designed to provide standardized methods for recording and tracking percutaneous injuries and blood and body fluid contacts.[27]

One nurse reported that she had "known about the HFT for the past 15 years in her role as clinical nurse educator," and another stated that she learned about it from "20 years in the OR."

How a decision to use the HFT is made. According to surgeons, disparity in use of the HFT was mainly determined by perioperative nurse preference and the type of surgical procedure being performed. One surgeon emphasized that newer nurses were more likely to use the HFT because they have a stronger fear of injury than more experienced nurses. In general, the respondents thought that nurses were more likely to use the HFT if they had HFT training. Three nurses and the surgical technologist reported that the scrub person decided on HFT use. One of them commented,

> *I was extremely clear on what I expected of [the surgeons'] role. I control the handling of sharps with surgeons. I make that a clear expectation when I scrub with them.*

Three nurses reported that the surgeons decided on HFT use. Two nurses said that the decision to use the HFT

According to surgeons, nurse preference and the type of procedure being performed determined whether the hands-free technique was used.

Staff members can establish neutral zones on conveniently placed Mayo stands or tables, basins placed on Mayo stands, basins that are passed back and forth, or on stable parts of the surgical field.

was shared or negotiated. Some nurses also emphasized that open discussions regarding the use of the HFT were lacking. The one nurse and two surgeons who reported using the technique most of the time during surgical procedures varied in their answers about which team member usually initiated the discussion on passing sharp items in surgery.

Two surgeons reported that because the HFT was practiced commonly by scrub personnel in their facility, it was not necessary to discuss its use before or at the beginning of a procedure. Three surgeons said that usually there was little or no communication about use of the HFT, and several identified that there should be. One surgeon always initiated discussion on HFT use at the beginning of the surgical procedure, stating rules and suggesting implementation strategies. Another respondent reported that the surgeon and the scrub person always discussed how the technique would be implemented, although, "it didn't matter who initiated it," and it usually "depended on the scrub person."

How the HFT is implemented. Respondents indicated that the HFT was implemented in a variety of ways. At times, neutral zones were established on conveniently placed Mayo stands. At other times, basins placed on Mayo stands were used as neutral zones, and sometimes basins that were passed back and forth were identified as neutral zones. Some surgeons preferred that stable parts of the surgical field be designated as safe zones, whereas others wanted magnetic pads placed on these sites. One surgeon who used the HFT most of the time reported that placement of the Mayo stand depended primarily on nurse preference, except during laparoscopic surgery when instruments had to be deposited on the surgical site because the scrub person stands away from the site.

Nurses reported establishing neutral zones using similar methods to those of surgeons. One scrub person specified that sharp instruments were placed in trays so that the sharp ends pointed away from the surgeon. Four nurses used towel-lined basins as neutral zones. Three nurses passed basins containing sharp instruments to surgeons, and one nurse described using "a basin lined with a towel, with the scalpel placed inside." At the beginning of each procedure, this nurse picked up the basin from the Mayo stand and passed the knife

> *in the basin to the surgeon, who places the basin down on the sterile area of the patient. The surgeon returns the scalpel blade into the basin [placed] at the edge of the incision site. I return [the blade] to the back table in the basin. We only use the HFT for the knife.*

Barriers and facilitators to using the HFT. The HFT was used most of the time by almost half of the respondents (ie, four surgeons and five nurses) when patients were known or suspected to be infected with hepatitis or HIV. Nurses reflected on this differential treatment by stating,

- "If we have a high-risk patient, [we] don't take as many chances,"
- ". . . we use HFT for hepatitis cases and stuff like that," and
- "We're extra careful when we have known that the patient had HIV or hepatitis."

The most common reason given by surgeons for using the HFT in these circumstances was for their safety and that of their coworkers. One surgeon stated, "I've been stabbed before [during such cases]."

The two surgeons who used the HFT most of the time reported that a decrease in surgical time was one possible facilitator to its use. Surgeons also said that nurses who had spontaneously decided

to implement the HFT were another important facilitator to its use. The two surgeons and one nurse who commonly used the technique identified the following barriers to HFT use:

- a surgeon's unwillingness to shift his or her gaze from the surgical field;
- a perioperative nurse's lack of knowledge about the technique;
- a lack of available equipment for HFT implementation (ie, magnetized rubber mats);
- inability to establish a neutral zone in a convenient location;
- sharp instruments that were too large to place in available trays or basins;
- habit;
- too many hands and people around surgical sites;
- an unstable neutral zone caused by wrinkles in the sheet;
- a break in the rhythm established during hand-to-hand passing;
- dulling of sharp instruments after repeated contact with metal trays; and
- a surgeon's personality.

Surgeons and nurses who did not use or rarely used the HFT identified similar barriers and cited a lack of supporting evidence that the HFT effectively reduced the risk of percutaneous injury and exposure to body fluids or that passing instruments hand-to-hand increased a person's risk of sharps injury.

Several surgeons and one nurse thought that there was no compelling evidence that the HFT made "a positive difference." Four surgeons speculated that HFT use would probably increase percutaneous injury because of the orientation of sharp items in basins. Few surgeons or nurses were aware of scientific articles on the effectiveness of the HFT, and many had never attended HFT presentations at conferences. Several were unaware that the HFT was incorporated into some official standards of practice.[18,20-22]

With one exception, those surgeons who cited the lack of evidence for the HFT's effectiveness as the reason for not using it only wore a single pair of gloves rather than double gloving during a procedure. None of these same surgeons used blunt suture needles during surgical procedures. These are risk-reduction measures for which there is level-one evidence of effectiveness.[13,14,28] Only one surgeon in the group of surgeons that did not regularly use the HFT reported wearing two pairs of gloves while performing surgical procedures. This same surgeon was infected with hepatitis C occupationally and only began double gloving after testing positive for hepatitis. Two of the surgeons who did not use the HFT also reported that the decision not to use the technique was a hospital decision, not one they had made.

With one exception, the surgeons who cited a lack of evidence for the effectiveness of the hands-free technique as their reason for not using it also did not double glove.

Several nurses and surgeons believed that the HFT was not appropriate for surgery in which microscopes were used because the surgeon must look away from the microscope to retrieve a sharp item. One respondent relied on "tactile sensation, judgment, and insight" to reduce risk, not the HFT or other protective measures. An obstetrician/gynecologist stated,

> *If it's just labor and delivery where I'm just kind of doing a spontaneous vaginal delivery or something, then I'm handling all the sharps myself, so the nurses really don't have anything to do with it at all.*

One surgeon remarked that use of the HFT might be more easily implemented

by "the guy working on the leg—you know, harvesting a graft, or something, but never up in the chest." A nurse said that it would be easiest to implement the neutral zone in general surgery, "even though I haven't found a general surgeon that will do it." Another nurse remarked, "Where I'm working at the moment, it's sometimes used and sometimes not . . . particularly in orthopedics." An orthopedic surgeon commented,

As long as [the sharp item is] oriented to me so that when I reach out I'm grabbing the instrument . . . it really doesn't matter where [the nurses] put it . . . it doesn't take much longer to glance at the tray and say I'd rather have this here and that there.

Respondents reported that surgeons as a whole demonstrated a lack of concern for their own personal health and safety.

Surgeons and nurses interviewed from the fields of neurosurgery, general surgery, cardiovascular surgery, thoracic surgery, vascular surgery, urology, orthopedics, and obstetrics/gynecology also identified the potential for increased duration of surgery as a barrier to HFT use. One surgeon who used the HFT most of the time thought that HFT use increased the duration of procedures as the surgeon began to learn the technique but that overall it probably would decrease operating time after proficiency was achieved. The two other respondents who used the HFT some of the time believed that even if it were necessary to glance away from the surgical site to use the HFT, this would not noticeably lengthen procedural time.

Some surgeons considered a lack of training among nurses to be an important barrier to HFT use. The nurse educator reported that nurses still were not trained to pass sharps using the HFT, and other nurses thought that whereas less experienced nurses might be more likely to practice the HFT, senior nurses would not be inclined to use the technique if they had not been taught to use it. Some nurses thought that OR personnel simply were not comfortable with use of the HFT. Others commented that novice nurses in particular were uncomfortable using it, and one respondent thought that her hospital administrators were implementing the HFT "too fast, with too many rules, and without adequate consultation with OR personnel."

Being trained in the technique, however, was not found in this study to be an indicator of a person's propensity to use it. One general surgeon said that he had been taught to use the HFT, but he chose not to use it. A nurse who primarily worked in thoracic surgery said that she had been trained in the technique, but she found hand-to-hand passing to be faster. Another nurse working in vascular surgery reported that she also had been taught the HFT. In her opinion, however, increased use of the technique resulted in an increase in injuries. Several surgeons and nurses indicated that there was likely to be a learning curve when first implementing use of the HFT and that the technique would become easier to perform after OR personnel got used to it.

Respondents in both the nurse and surgeon groups reported that surgeons as a whole demonstrated a lack of concern for their own personal health and safety and that they did not perceive any further need to reduce the risk of sharps injury or other exposures. When asked directly, however, most surgeons and some nurses thought that they had a significant risk of acquiring a bloodborne pathogen from an occupational exposure. One nurse and two surgeons said that they did not think about these risks very much.

SUGGESTIONS TO INCREASE USE OF THE HFT. Surgeons seemed more resistant to HFT use, and they provided fewer suggestions on ways to increase use of the technique than did nurses. For instance, one nurse's example of problem solving was,

> *The surgeon needed space on the Mayo stand for all his instruments, and he liked the scalpel up there all the time, so . . . I used a smaller dish and kept it up there all the time. . . . I handed him the dish with my hand underneath the dish so that he could reach it.*

Study participants mentioned their need to practice the hands-free technique before using it during actual surgery.

To promote HFT use in a facility, some surgeons and nurses suggested using educational videotapes and campaigns with

- visible buy-in from key personnel, such as the chief of surgery for surgeons and other opinion leaders for nurses;
- data available on
  - the frequency of injuries associated with passing sharp items hand to hand,
  - the effectiveness of the HFT, and
  - the costs associated with the post-exposure follow-up; and
- clear examples of HFT implementation both
  - in different types of surgery and
  - when passing a variety of sharp items.

Participants also mentioned the importance of inservice training on HFT use for nurses and having the opportunity to practice using the HFT before implementing it during actual surgery.

RESPONDENTS' USE OF ADDITIONAL RISK-REDUCTION MEASURES. Although several surgeons and nurses reported that standard precautions were sufficient protection during surgery, interviewees did not consistently mention wearing additional facial protection such as goggles or face shields to protect against exposure to infectious agents. Only the three participants who used the HFT most of the time mentioned using additional facial protection and routinely wearing two pairs of gloves. Although the surgeon with hepatitis C wore two pairs of gloves, this practice was only begun after he had acquired the infection. Of the three participants who used the HFT most of the time, the two surgeons also mentioned substituting blunt suture needles for sharp ones and cauterizing with a blade instead of a needle whenever possible.

Several surgeons and nurses mentioned awareness of the location of all sharp items at all times as an important risk-reduction measure. Some also reported capping needles after use to reduce risk, whereas others mentioned not capping needles for the same reason. The surgeons and the nurse who use the HFT most of the time additionally mentioned the following injury-reduction measures:

- not rushing at any time;
- always communicating clearly;
- sometimes donning cut-resistant gloves, glove liners, and impermeable gowns;
- using retractors instead of hands to expose tissues;
- using needle drivers to load sutures and only loading them immediately before use;
- placing blades on magnetic pads; and
- using staples and glue instead of sutures to close wounds.

DISCUSSION

Surgical procedures typically are bloody and involve the use of many sharp instruments handled by diverse

groups of personnel with varying levels of skill. These individuals often are wearing apparel that makes their words and gestures difficult to interpret. The HFT is believed to be a way of increasing predictability by decreasing variability in methods used to pass sharp items; and, as a result, team safety is less dependent on each individual's alertness. This conclusion is consistent with human factors research.[29] Such standardization is intended to improve the overall safety of OR personnel and their patients during surgery. Research also suggests that making one type of activity safer also may reduce other indirectly related injuries and exposures because the need for decreased vigilance in one area facilitates increased vigilance in other areas.[30]

KNOWLEDGE ABOUT AND USE OF THE HFT. Although the HFT has been recommended by OSHA, AORN, ORNAC, the ACS, and the American Association of Orthopedic Surgeons and is OR policy in many hospitals in Canada and the United States, several study participants were unable to correctly define the HFT, explain how it could be implemented, or accurately quantify how often they used the HFT during surgical procedures. Most respondents in this study did not use the HFT most of the time during surgery. This finding is consistent with results from the largest study on HFT use and its effectiveness. That study found that even when the use of the HFT was hospital policy, it was used 75% to 100% of the time in only 42% of the 3,765 surgical procedures that were investigated.[2]

REASONS FOR NOT USING THE HFT. Surgeons in the current study provided fewer suggestions than nurses about ways to increase use of the HFT. The surgeons who did not use the technique most of the time emphasized that this was because of a lack of evidence demonstrating the effectiveness of the HFT. A majority of these surgeons, however, also did not consistently wear two pairs of gloves or use blunt suture needles—two risk-reduction measures that have been shown to reduce the risk of percutaneous injuries in repeated, rigorous studies.[11-14] These findings also are consistent with the results of a recent Canadian study of surgeons' lack of willingness to wear two pairs of gloves during surgery.[30] As noted in an ongoing multihospital intervention study (ie, the third phase of this research project), surgeon resistance to the HFT may be more related to dysfunctional communication and team function in the OR than to the introduction of a new safety procedure.[31]

HOW NURSES MIGHT INFLUENCE SURGEONS' HFT USE. In our study, surgeons frequently identified nurses' and surgical technologists' lack of HFT training as a barrier to increased HFT use. The implication is that if nurses could adapt HFT use to a variety of procedures, surgeons' resistance might decrease. More specifically, nurses and surgical technologists should be responsible for selecting appropriate neutral zones for each procedure and ensuring safe access by all scrubbed personnel. For example, nurses and surgical technologists might implement the use of basins to contain individual, lighter, sharp items that should be passed back and forth as well as position adjustable Mayo stands or tables for easy retrieval of bulkier, heavier items by surgeons and residents. Alternatively, nurses and surgical technologists might establish two neutral zones during one procedure, such as a section of the surgical field for sharp items to be placed on and retrieved and a Mayo stand on which

If nurses could adapt to using the hands-free technique in a variety of procedures, surgeons' resistance to the technique might decrease.

The surgeon can implement the hands-free technique by learning to shift his or her gaze away from the surgical site in order to lay down or pick up a sharp instrument.

sharp items could be dropped after use. Surgeons suggested that although aspects of the HFT required planning, a trained nurse who is able to implement and adapt the technique could overcome the barriers to its use.

Shift of gaze and other barriers. The most significant barrier to using the HFT that was identified by both surgeons and nurses was the surgeon's reluctance to shift his or her gaze away from the surgical site or microscope to retrieve or return sharp items. It should be noted that a shift of gaze from a surgical site is different from and should not be equated with a shift of gaze from a microscope. In the former instance, this usually can be performed without losing procedural continuity. A shift of gaze in this instance should be seen simply as acquiring a new surgical skill.[6,32]

Although participants also suggested that use of the HFT would increase the duration of a procedure, there are no data to indicate that this is true. Longer procedural times may occur to a small extent when the HFT first is learned, but this would not be expected to continue for long. In fact, it is equally possible that HFT use may lead to decreased surgical time. A longer procedural time has been linked to an increase in the risk of wound infection,[33] so future research efforts should be undertaken to address the effects of the HFT on the duration of surgical procedures.

Study Limitations

Our objective was to explore and identify the attitudes of surgeons, perioperative nurses, and surgical technologists about use of the HFT. We selected participants using purposeful sampling; and accordingly, the study did not yield quantitative information about relative frequency of attitudes. Although a sample of 20 is not large by epidemiological standards, it did permit thematic saturation. By the 20th interview no additional themes were identified.

We collected data for this study during the summer and fall of 2003 and spring of 2004; however, there have been no trends in HFT practices since then to suggest that interview responses would be different in 2006. Another limitation may be the $100 honorarium given to the study participants. This could have affected the voluntary nature of participation in the study and the responses of the participants. Future quantitative research into the HFT is recommended; and, as previously mentioned currently is being carried out.

Conclusion

In this study, most participants did not regularly use the HFT. The surgeons interviewed generally were more resistant to HFT use than the nurses, and the surgeons also suggested fewer ways to increase its use. Two of the main reasons given by all respondents for not using the technique were lack of evidence of effectiveness and the reluctance of a surgeon to shift his or her gaze away from the surgical site or microscope. Surgeons in this sample who did not use the HFT also did not follow the evidence-based protective measures of wearing double gloves and using blunt suture needles.

Information from this study has been used in conjunction with previous research and established knowledge transfer principles to develop an educational video promoting HFT use during surgery. This video currently is being used in another ongoing, before-and-after, intervention study (ie, the third phase of the three-phase research project that includes this interview study). Although the HFT is a risk-reduction measure that requires minimal additional materials and training cost to implement, it is not being adopted commonly. Additional evidence on the effectiveness of the HFT is needed. To this end, data on the HFT

are being collected in the intervention study in which the video is being used along with data on other aspects of HFT use (ie, whether the use of the HFT only 50% of the time increases a health care worker's occupational risk of sharps injury and other exposures). The results of the investigation will help determine future recommendations for HFT use. ❖

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