

Orthopedic Surgeons' Attitudes and Practices Concerning Treatment of Patients with HIV Infection

PAUL M. ARNOW, MD
LAWRENCE A. POTTENGER, MD, PhD,
CAROL B. STOCKING, PhD
MARK SIEGLER, MD
HENRY W. DeLEEuw, MD

Dr. Arnow is Associate Professor of Medicine and Hospital Epidemiologist; Dr. Pottenger is Associate Professor of Surgery; Dr. Stocking is Research Associate and Director of Research at the Center for Clinical Medical Ethics, Department of Medicine; and Dr. Siegler is Professor of Medicine and Director of the Center for Clinical Medical Ethics, Department of Medicine; all of the University of Chicago. Dr. DeLeeuw is Resident, Department of Orthopedic Surgery, University of Pittsburgh.

The paper was presented in part at the Third International Conference on AIDS, Washington, DC, June 1987.

Tearsheet requests to Paul M. Arnow, MD, University of Chicago Medical Center, Department of Medicine, 5841 S. Maryland Ave., Box 11, Chicago, IL 60637.

Synopsis

Concern regarding an occupational risk of acquiring human immunodeficiency virus (HIV) in-

fection may influence surgeons' willingness to operate. A questionnaire survey of all orthopedists in the five cities with the most cases of acquired immunodeficiency syndrome (AIDS) was conducted to assess attitudes and practices. Questionnaires were completed anonymously by 325 of 510 orthopedists. In the previous year, 43 percent had examined or operated on an HIV-infected patient, and at least 90 percent who had had an opportunity to operate on an HIV-infected patient had chosen to do so.

Decisions to operate did not appear to be based on hospital requirements, perceived ethical obligations, or knowledge of HIV transmissibility. Most orthopedists (85 percent) claimed the right to order preoperative HIV testing of high-risk patients, but such testing was ordered infrequently. Although most orthopedists believed they could not be compelled to operate and that ethically they could refuse when their health was threatened, they almost always were willing to treat HIV-infected patients.

THE GROWING PUBLIC HEALTH problem of providing care to those infected with the human immunodeficiency virus (HIV) is increasing the numbers of health care providers concerned about possible occupational risks of becoming infected themselves.

Basic statistics reported by the Centers for Disease Control show that by November 23, 1987, 47,022 cases of acquired immunodeficiency syndrome (AIDS) had been reported (1), and 13,097 of the cases were reported during 1986 (2). It has been estimated that at least 1 million other persons in the country are infected with HIV (3). Cases of AIDS have been reported in all 50 States. By November 1987, 30 States each had reported more than 100 cases (1). As the number of persons infected by HIV increases, more health care workers are being called upon to treat them.

Concern regarding a possible occupational risk of acquiring HIV infection has caused anxiety among health care workers and has engendered a general reluctance to provide direct care to infected patients (4-6). Decisions about rendering treatment to HIV-infected patients may be especially difficult for surgeons. HIV can be transmitted by percutaneous inoculation of blood (7-10), and punctures in gloves that can result in inoculation occur frequently during surgery (11,12). Moreover, the occupational risk of acquiring hepatitis B infection, which is transmitted in hospitals by the same route as HIV, is higher for surgeons than for most other health care workers (13,14). Attitudes of surgeons toward the occupational risk of HIV infection appear particularly important because of the highly specialized services that surgeons provide and their leadership role in many hospitals.

'When respondents were asked how transmissible they believed HIV to be by accidental needlestick, 9 percent reported that they thought it to be highly transmissible, 26 percent thought it to be moderately transmissible, 30 percent correctly reported that HIV has very low transmissibility, and 34 percent were not sure.'

As part of a hospital effort to develop policies concerning management of patients with HIV infection, we surveyed surgeons in other cities to learn their attitudes and practices. We chose orthopedic surgeons because a high proportion of their patients are young and middle-aged men, and because orthopedic surgeons are at substantial risk of skin puncture injuries during operative procedures.

Methods

Questionnaires were mailed to all orthopedists in the 1985 American Academy of Orthopedic Surgery (AAOS) Directory with office addresses in the five cities that had reported the largest number of AIDS cases as of December 31, 1985. The cities were New York (5,277 cases), San Francisco (1,826 cases), Los Angeles (1,439), Miami (505 cases), and Washington, DC (496 cases). Demographic information about all orthopedists in these cities was requested from AAOS, but the information could not be provided.

Questionnaires initially were mailed in March 1986 to 571 orthopedists. During the next 4 months, repeat mailings of the questionnaire were sent to nonrespondents as many as 3 times, as necessary. Other followup techniques, such as telephoning nonrespondents, were considered too aggressive and were not attempted. Sixty-one orthopedists were removed from the survey population because they had retired or died, or their questionnaires were returned as undeliverable.

Specific topics addressed by the questionnaire included

- their level of experience with HIV-infected patients
- their previous decisions to operate on HIV-infected patients

- their willingness to operate on HIV-infected patients in various risk groups
- their opinion of appropriate restrictions to place upon the professional activities of an HIV-infected surgeon
- their knowledge about the transmissibility of HIV by accidental needlestick, and
- precautions that they would take when operating on an HIV-infected patient.

Respondents also were asked to indicate their strength of agreement or disagreement with a series of Likert-type statements concerning

- a surgeon's obligation to operate on an HIV-infected patient in various situations
- the right of hospitals to require surgeons to operate on HIV-infected patients
- preoperative testing of patients for HIV antibodies
- the obligation of surgeons to have themselves tested for HIV infection, and
- the patient's right to know if his or her surgeon is infected.

Other items included in the questionnaire were not evaluated for this report. A copy of the questionnaire is available from the authors.

The virus currently designated HIV was known as HTLV-III/LAV at the time the questionnaire was prepared and distributed. The name HTLV-III was used in the questionnaire, but in this report the newer designation, HIV, is used. The questionnaires were completed anonymously and were not coded or numbered for record keeping. The only personal identifiers were age (by decade), marital status, and type of practice. Respondents were provided with an identifying postcard to be mailed separately to the study director when they sent back their completed questionnaires; 324 postcards and 325 questionnaires were received.

Orthopedic surgeons' attitudes and practices (dependent variables) were examined using city, age, type of practice, and two constructed variables as independent variables. The first constructed variable, experience with HIV-infected patients in the previous year, combined four questions and was scored as zero when respondents had neither examined nor operated on an HIV-infected patient, as one when they had examined but did not operate on an HIV-infected patient, and as two when they had operated on one or more such patients during the preceding year.

The second constructed variable concerned

knowledge about transmissibility of HIV. Answers to two questions were summed; responses were scored as two when both answers were correct, as one when one answer was correct, and as zero when neither answer was correct. "Strongly agree" and "agree" responses to Likert-type statements were combined as "agreed" in the data presented subsequently. Most null findings were not reported. The chi-square test or McNemar's test were used to assess whether differences in proportions were statistically significant. The two-sample *t*-test was used to compare continuous variables.

Results

Survey response. Questionnaires were completed by 325 (64 percent) of the 510 orthopedists surveyed. Response rates by city were Miami, 72 percent (36 of 50); San Francisco, 71 percent (75 of 106); Washington, DC, 67 percent (35 of 52); New York, 60 percent (107 of 178); and Los Angeles, 58 percent (72 of 124).

Respondent characteristics. All respondents were currently practicing surgeons; 38 percent were in solo private practice, 33 percent were in private orthopedic group practice, 24 percent were in academic full-time practice, and 5 percent were in multi-specialty groups. Fifty-seven percent performed 3 to 5 operations per week, 17 percent performed 6 to 8 operations per week, and 11 percent reported performing more than 8 operations per week. Sixty-eight percent of the respondents were between 40 and 59 years old, and 19 percent were 60 or older. Eighty-seven percent were currently married.

Experience with HIV-infected patients. Seventy respondents (22 percent) reported having operated on at least 1 patient with AIDS, AIDS-related complex (ARC), or asymptomatic HIV infection within the past year. An additional 68 (21 percent) had examined but had not operated on such a patient. There were 26 respondents who had examined or operated on 6 or more HIV-infected patients during the past year. The number of operations on HIV-infected patients by each orthopedist was reported as a range (zero, 1-5, > 5). Based on the lower boundary of the range, the minimum number of operations on HIV-infected patients during the previous year was 175.

Experience with HIV-infected patients differed by city. Fifty-nine percent of respondents in San Francisco had examined or operated on an HIV-

infected patient, compared to 49 percent in Washington, 39 percent in Los Angeles, 36 percent in New York, and 31 percent in Miami (chi-square = 16.52, $P < 0.05$).

Knowledge of HIV transmissibility. When respondents were asked how transmissible they believed HIV to be by accidental needlestick, 9 percent reported that they thought it to be highly transmissible, 26 percent thought it to be moderately transmissible, 30 percent correctly reported that HIV has very low transmissibility, and 34 percent were not sure.

Respondents were asked to compare the transmissibility of HIV by needlestick to that of hepatitis B virus. Three percent thought HIV was more transmissible, 26 percent thought it was equally transmissible, 33 percent correctly responded that it was less transmissible, and 38 percent were not sure.

Overall, 60 percent of respondents did not answer either question about HIV transmissibility correctly, 18 percent answered one question correctly, and 22 percent answered both correctly. Knowledge about transmissibility did not differ significantly between those who responded early in the survey and those who responded later (chi-square = 1.235, $P > 0.5$).

Respondents were given a list of possible precautions that might be taken during surgery and were asked to indicate which they would use when operating on an HIV-infected patient. Ninety-three percent reported they would wear extra gloves, 73 percent would wear goggles, 63 percent would require experienced assistants, and 55 percent would proceed more slowly during the operation. Thirty-eight percent would wear an extra mask or gown, measures which the authors believe are not useful in preventing HIV transmission.

Sixty-one percent of respondents would use 3 or more of the above precautions, and 32 percent would use at least 4 of the precautions when operating on a patient with HIV infection. The number of precautions that each respondent would use did not vary significantly with experience with HIV-infected patients or knowledge about transmissibility of HIV ($P > 0.1$ for each comparison, chi-square test).

Restrictions on an infected surgeon. Orthopedists were asked what restrictions should be placed on a surgeon who becomes HIV-infected. Forty-nine percent responded that there should be no restrictions, 7 percent thought an infected surgeon should

Table 1. Survey of orthopedists' opinions regarding a surgeon's ethical obligation to operate on HIV- infected patients in different situations (percentage distribution)

| Situation | Number of respondents | Strongly agree | Agree | Don't know | Disagree | Strongly disagree |
|--|-----------------------|----------------|-------|------------|----------|-------------------|
| Emergency | 322 | 40 | 41 | 8 | 7 | 4 |
| When surgery will greatly affect quality of life | 318 | 26 | 35 | 15 | 17 | 7 |
| In all situations when surgery is indicated | 318 | 12 | 23 | 15 | 32 | 19 |

avoid only major surgery, 39 percent thought all surgery should be avoided, and 5 percent responded that an infected surgeon should discontinue practice. Those who answered that an infected surgeon should avoid major surgery, avoid all surgery, or discontinue practice are included in the analysis as favoring restrictions.

Opinions about the need for restrictions on the professional activities of infected surgeons varied with knowledge about transmissibility of HIV. Thirty-eight percent of orthopedists who correctly answered both knowledge questions favored restrictions, compared to 64 percent of those who answered 1 question correctly and 53 percent of those who answered neither correctly (chi-square = 8.88, $P < 0.025$).

We examined whether respondents who favored restrictions would take more precautions when operating than would other respondents. The mean number (+ SD) of precautions that would be taken by the former group was 3.1 (± 1.4), compared to 2.6 (± 1.3) by respondents who did not think that the professional activities of infected surgeons should be restricted ($P > 0.5$, two sample t-test). However, respondents who favored restrictions were significantly more likely than others to use all 5 precautions (21 percent versus 7 percent, chi-square = 9.45, $P < 0.005$).

Obligation to operate. As shown in table 1, 81 percent of respondents agreed that an orthopedist is ethically obligated to operate on HIV-infected patients in emergency situations, 61 percent agreed that an orthopedist is ethically obligated to operate in situations in which surgery will greatly affect the patient's quality of life, and 35 percent agreed that an orthopedist is ethically obligated to operate in all situations in which surgery is indicated.

The percent of respondents who agreed that surgeons are obligated to operate in all situations when surgery is indicated differed among cities. The proportion of respondents who agreed with the statement was 44 percent in San Francisco, 38

percent in New York, 35 percent in Los Angeles, 26 percent in Washington, DC, and 11 percent in Miami (chi-square = 13.60, $P < 0.01$).

Responses to questions concerning the surgeon's obligation to operate were examined in relation to knowledge of HIV transmissibility. For each of the situations presented in table 1, responses did not differ significantly among respondents with different levels of knowledge (coded as zero, 1, or 2) of HIV transmissibility ($P > 0.1$, chi-square test).

Perceived ethical obligation to operate was examined in relation to beliefs concerning the need for restrictions on the professional activities of HIV-infected surgeons. Twenty-seven percent of respondents who favored restrictions agreed that an orthopedist is ethically obligated to operate in all situations in which surgery is indicated, 57 percent when surgery would greatly affect quality of life, and 79 percent in emergency situations.

Among respondents who did not favor restrictions, the rates of agreement with ethical obligation in these three situations were 45 percent, 69 percent, and 84 percent. Differences in responses among orthopedists who favored restrictions and those who did not were significant for each of the first two situations (when surgery was indicated, chi-square = 9.20, $P < 0.005$; when quality of life would be affected, chi-square = 4.04, $P < 0.05$).

Refusal to operate. Sixty-nine percent of respondents agreed that an orthopedic surgeon may ethically refuse to operate on HIV-infected patients if operating may endanger the health of the surgeon or the surgeon's family. Agreement with this statement was not associated with independent variables such as marital status or practice type, but was inversely related to responses to questions concerning ethical obligations to operate. For example, 79 percent of respondents who did not believe surgeons are obligated to operate in all situations in which surgery is indicated agreed that a surgeon may ethically refuse in order to protect himself or his family. Only 47 percent of respondents who

believed that the surgeon is ethically obligated in all situations also believed a surgeon ethically can refuse (chi-square = 32.15, $P < 0.005$).

Fourteen respondents (4 percent) at some time had declined to operate on an HIV-infected patient. Six of the 14 had, however, operated on other HIV-infected patients. We examined the 14 surgeons' responses to questions concerning ethical obligation to operate. Fifty-seven percent believed themselves obligated to operate in emergencies, 14 percent in situations in which quality of life would be greatly affected, and 7 percent of all situations in which surgery is indicated. Each of the latter two rates differed significantly from the corresponding rate for respondents who always had operated on patients with HIV infection (each P value < 0.05 , chi-square test).

The rate of agreement about whether a surgeon may ethically refuse to operate did not differ significantly among surgeons who had operated and those who had declined to operate on HIV-infected patients. The belief that a surgeon may ethically refuse to operate to avoid endangering his health or the health of his family was affirmed by 59 percent of orthopedists who had always operated on HIV-infected patients, 63 percent of those who had always declined to operate, and 100 percent of those who had both operated and declined to operate.

Knowledge of HIV transmissibility did not differ significantly among orthopedists who had ever declined to operate compared to other orthopedists. Twenty-one percent of those who declined answered both questions correctly, and 57 percent answered at least one question correctly. None of the 14 who declined had characterized HIV as "highly transmissible by accidental needlestick" or "more transmissible by needlestick than hepatitis B virus."

Twelve of the respondents who had ever declined to operate answered the question concerning restrictions that they believed should be placed on the professional activities of a surgeon who becomes infected with HIV. All 12 believed that a surgeon who becomes infected should either discontinue practice or avoid all surgery (table 2). However, only 49 percent of other respondents believed restrictions are necessary (chi-square = 9.98, $P < 0.005$).

Respondents were asked whether they would be "less likely to operate" on an HIV-infected patient, based on the risk group to which the patient belonged (table 3). The purpose of the question was to assess whether risk group membership

Table 2. Survey of orthopedists' opinions concerning restrictions on the professional activities of HIV-infected surgeons

| Previous experience with HIV-infected patients | Number of respondents | Percent of respondents favoring restrictions |
|--|-----------------------|--|
| Neither operated nor declined | 214 | 51 |
| Operated and never declined | 59 | 41 |
| Both operated and declined | 4 | 100 |
| Declined and never operated | 8 | 100 |

Table 3. Survey of orthopedists' attitudes toward operating on HIV-infected patients from various risk groups

| Previous experience with HIV-infected patients | Number of respondents | Percent of respondents "less likely to operate" on HIV-infected patients from each specific risk group | | |
|--|-----------------------|--|------------|----------------|
| | | Hemophilic | Homosexual | IV drug abuser |
| Neither operated nor refused | 247 | 24 | 26 | 35 |
| Operated and never refused | 64 | 18 | 16 | 27 |
| Refused ¹ | 14 | 42 | 67 | 78 |
| Total | 325 | 23 | 25 | 35 |

¹6 respondents had operated on at least 1 HIV-infected patient.

would bias an orthopedist's willingness to operate. Regardless of previous experience with HIV-infected patients, respondents were biased more often against operating on IV drug abusers than either hemophiliacs (chi-square = 28.17, $P < 0.005$, McNemar's test) or homosexuals (chi-square = 22.75, $P < 0.005$, McNemar's test). Those respondents who previously had declined to operate on an HIV-infected patient were biased more often than were other orthopedists against operating on HIV-infected patients, regardless of the risk group to which the patient belonged.

Only 12 percent of all respondents thought that a hospital may require surgeons to operate on infected patients.

Preoperative testing. Seventy-one percent of respondents agreed that surgeons have the right to demand that all patients be tested preoperatively for HIV infection. Eighty-five percent agreed that surgeons have the right to test members of high-risk groups. Respondents who believed that surgeons have the right to test all patients agreed less often than other respondents with the statement that a surgeon is obligated to operate on HIV-infected patients (table 4).

Only 2 percent of respondents reported that in

Table 4. Survey of attitudes concerning obligation to operate on HIV-infected patients among orthopedists with differing attitudes toward preoperative HIV testing of patients

| Surgeon's right to test all patients | Percent of respondents who agree that a surgeon is ethically obligated to operate in specified situation | | |
|--------------------------------------|--|--|---|
| | Emergency | When surgery will greatly affect quality of life | In all situations when surgery is indicated |
| Agree | 77 | 55 | 30 |
| Do not agree | 89 | 70 | 46 |

NOTE: In all 3 situations, the proportion of respondents who agreed that a surgeon is ethically obligated to operate was significantly lower among those who agreed, compared with those who did not agree that surgeons have the right to test all patients preoperatively (all P values < 0.025 , chi-square test).

practice they routinely request preoperative testing of all patients for HIV antibodies. Twenty-three percent reported that they routinely request preoperative testing of patients at high risk of HIV infection.

Testing of patients in high-risk groups was requested most often by orthopedists who operated on HIV-infected patients. Thirty-six percent of respondents who had operated on an HIV-infected patient tested high risk patients routinely, compared to 22 percent of respondents who had examined an HIV-infected patient and 18 percent of respondents who had not examined or operated on an HIV-infected patient (chi-square = 9.15, $P < 0.025$).

Sixty-five percent of respondents who routinely tested high risk patients, compared to 47 percent of those who did not, thought that an orthopedic surgeon should restrict his clinical activities if he became infected (chi-square = 5.81, $P < 0.025$). Use of routine preoperative testing did not differ significantly among respondents with different levels of knowledge (coded as zero, 1, or 2) of HIV transmissibility.

Self-testing by surgeons. Seventy-nine percent of respondents thought that orthopedic surgeons should have themselves tested for HIV infection after a possible HIV inoculation. Fifty-one percent thought that they should have themselves tested if their practice included patients in high risk groups. Only 7 percent felt that they should have themselves tested annually no matter where they lived or practiced.

Patients' right to know if their surgeon is HIV-positive. Forty-three percent of respondents agreed that patients have the right to know if their surgeon is HIV-positive, 31 percent disagreed, and 26 percent did not know. Those who agreed that

patients have the right to know were more likely than others to agree that the clinical activities of an infected surgeon should be restricted (64 percent versus 42 percent (chi-square = 12.91, $P < 0.005$), and that a surgeon should have himself tested annually if he treats high risk patients (72 percent versus 35 percent (chi-square = 41.97, $P < 0.005$). Opinion as to whether a patient has a right to know if his surgeon is infected did not differ significantly by experience with HIV-infected patients or knowledge of HIV transmissibility.

Discussion

The risk to hospital workers of occupationally acquiring HIV infection has been of concern since the AIDS epidemic was recognized. As of March 1986, when questionnaires for the present study were mailed, one instance of documented needlestick HIV seroconversion in a nurse had been reported (9) and three studies of HIV infection in exposed hospital personnel had been published (15-17). Two studies examined seroprevalence and instances of HIV infection in 75 workers with no other apparent risk factors who had percutaneous or mucus membrane exposure to HIV-infected blood. The third study, by the Centers for Disease Control, was prospective, and researchers found no instances of HIV seroconversion in 40 health care workers followed after percutaneous or mucus membrane exposure to body fluids of AIDS patients. Subsequently, a substantial number of cases of occupationally acquired HIV infection in health care workers has been recognized, and these cases recently were summarized by the Centers for Disease Control (18).

Worldwide, including the nurse mentioned above, 15 health care workers have developed HIV infection indicated by the timing of seroconversion to have been caused by occupational exposure to the blood of HIV-infected patients. Most of the cases involved percutaneous exposure to blood, such as by needlestick, but four cases apparently resulted from infective blood splashing onto mucous membranes or transiently contacting nonintact skin (19,20).

In response to concerns about possible nosocomial transmission of HIV, the Centers for Disease Control (20,21) and other groups (4,5,22,23) formulated infection control guidelines for health care workers. The guidelines describe precautions for patients with proven or suspected HIV infection, and most of the guidelines explicitly state that there is no basis for healthy hospital personnel to be

excused from providing care to these patients (4,5,22,24). Nonetheless, some personnel remain concerned about an occupational risk of HIV transmission, and this concern may affect care given to patients. A survey of 1,194 workers in a Washington, DC, hospital showed that 35 percent actively avoided involvement with AIDS patients and one-third believed they should be permitted to refuse to care for AIDS patients (25). In another hospital, where 267 nursing personnel responded to a questionnaire, about 10 percent of those who had been called upon to care for AIDS patients indicated that they had refused (26). In a survey of Los Angeles physicians in various specialties, 22 percent believed that their staff would quit if asked to treat AIDS patients (27).

Our analysis shows that in the five cities with the greatest number of AIDS patients, orthopedic surgeons frequently treated patients with HIV infections. In the previous year, 43 percent of respondents had examined or operated on an HIV-infected patient, and at least 175 operations on such patients were performed. We considered orthopedic surgeons who had operated on an HIV-infected patient to be willing to operate, even if they had declined to operate on another patient. By this method, 90 percent (70 of 78) of the surgeons with HIV-infected patients for whom surgery was considered were willing to operate. This rate may actually underestimate willingness to operate, because the question about experience operating on HIV-infected patients addressed only the previous year, while the question about declining to operate covered all previous years.

The reasons for declining to operate were not determined and may have been based on prognosis or other medical issues, rather than on the surgeon's fear of becoming infected. To our knowledge, rates of refusal to operate on HIV-infected patients have not been reported for other surgeons. However, a survey of health professionals in an area of Britain with many HIV-infected patients found that 18 percent of surgeons, and an even higher percentage of other physicians, favored transfer of HIV-positive patients to special units when invasive procedures were required (6). In a Los Angeles survey, 81 percent of physicians agreed that special clinics staffed by physicians with particular expertise should be established to treat AIDS patients and 77 percent indicated that they would refer patients they diagnosed (27).

Testing to detect HIV infection was utilized infrequently by orthopedists we surveyed. Fewer than one-fourth routinely tested high-risk patients

'Our data indicate that orthopedists do not believe they can be compelled to operate, but at most only a small percentage would decline to operate, on HIV-infected patients in situations in which surgery would be beneficial.'

preoperatively, even though 85 percent of respondents believed surgeons have the right to order such testing. Thus, operations on HIV-infected patients may have been performed much more often than was recognized.

The high rate of willingness to operate is striking, in view of the perception by most respondents that HIV infection is highly or moderately transmissible by accidental needlestick. Only 26 percent of the 70 surgeons who operated answered both knowledge questions correctly, while 37 percent considered HIV to be more transmissible than it is. A lower rate of willingness to operate might have been expected, based on the belief by 69 percent of all respondents and 63 percent of the orthopedists who had operated on an HIV-positive patient, that a surgeon may ethically refuse to operate if he feels it may endanger his health or that of his family.

Respondents were not asked directly why they had operated or declined to operate on HIV-infected patients. Instead, attitudes were examined to assess whether factors other than a patient's medical condition might be important. Perceived ethical obligation apparently played a role, in that orthopedists who had operated on HIV-infected patients were more likely to feel an obligation to operate in specified situations than were orthopedists who had declined. However, ethical obligation clearly was not the primary motivation for at least some of 70 orthopedists who had operated, because 12 (17 percent) of them did not feel ethically obligated to operate in any of the situations described in the questionnaire. For these orthopedists, and probably for many others, factors such as peer pressure, or a desire to maintain referral networks, may have been the dominant considerations. Most orthopedists, including more than 60 percent of those who had operated on HIV-infected patients, considered it ethical for a surgeon to refuse to operate, based on concern for his health and that of his family. The conflict in ethical obligations to patients and to self is illustrated by the observation that 47 percent of orthopedists who believed that a

surgeon is ethically obligated to operate on an HIV-infected patient in all situations in which surgery is indicated also believed that a surgeon may ethically refuse to operate to protect his health or that of his family.

Although one survey of physicians showed that they tend to stigmatize AIDS patients (28), few orthopedists in the present survey declined to operate on HIV-infected patients, and reasons for these decisions are not known. However, a decreased *a priori* willingness to operate is suggested by responses to two questions. First, orthopedists who had ever declined to operate were more likely not to operate on members of HIV risk groups than other orthopedists. This attitude was acknowledged most often about IV drug abusers (83 percent) and homosexuals (67 percent), but it also was reported about hemophiliacs (42 percent). Second, orthopedists who had declined to operate considered restrictions on the professional activities of a surgeon to be a necessary consequence of that surgeon having acquired HIV infection. This concern about a serious effect of HIV infection on the livelihood of surgeons apparently reflected personal views, because recommendations of the Centers for Disease Control released prior to the survey did not address the topic of infected health care workers who perform invasive procedures (19), and subsequent recommendations announced during the survey did not advocate restrictions (29). Nonetheless, attitudes about operating on members of risk groups and a high level of concern about the potential consequences of acquiring HIV infection may explain why knowledge of HIV transmissibility did not differ between orthopedists who operated and those who declined. Given that the risk of intraoperative transmission to surgeons is low, a surgeon still might choose not to accept even a low risk if he views the patient with disfavor or if he views the consequences of infection to be devastating personally or professionally.

A responsibility of each physician to treat patients with AIDS has been asserted widely (4,30). The basis for these assertions appears to have been a moral viewpoint rather than a legal duty or a specific covenant set forth by a medical association. A physician's legal duty to treat arises from a mutual accommodation and a consensual transaction between patient and physician (31). In American medicine, except in emergencies or instances where a doctor-patient relationship has been established previously, physicians may choose whom they will serve (32). In November 1987, the Council on Ethical and Judicial Affairs of the American

Medical Association said that this principle "does not permit categorical discrimination against a patient based solely on his or her seropositivity" and reasserted the tradition that physicians must risk their own health in epidemics (24).

The results of this study may not be applicable to all orthopedists or to other groups of surgeons. The survey queried only orthopedists in major cities with large numbers of AIDS cases and the response rate was 64 percent. While this rate compares favorably with those of other mail surveys of physicians (33-35), information is still lacking concerning a sizable minority of orthopedists. Because the questionnaires were completed anonymously, we consider it unlikely that orthopedists who had attitudes that they feared were unpopular comprised a disproportionately large share of the nonrespondents.

Our data indicate that orthopedists do not believe they can be compelled to operate, but at most only a small percentage would decline to operate on HIV-infected patients in situations in which surgery would be beneficial. The risk of infection of the surgeon appears quite small, and pressures other than moral arguments are considerable. These pressures include availability of other orthopedists to do the surgery, the natural reluctance of surgeons to use personal feelings as a basis for refusing to operate, and desire to avoid adverse peer judgment.

References.....

1. Centers for Disease Control: Acquired immunodeficiency syndrome (AIDS). Weekly Surveillance Report, United States, Nov. 23, 1987.
2. Centers for Disease Control: Acquired immunodeficiency syndrome (AIDS). Weekly Surveillance Report, United States, Dec. 29, 1987.
3. Public Health Service: Coolfont report: a PHS plan for prevention and control of AIDS and AIDS virus. Public Health Rep 101:341-347, July-August 1986.
4. Eickhoff, T. C. et al.: A hospitalwide approach to AIDS: recommendations of the Advisory Committee on Infections within Hospitals, American Hospital Association. Infection Control 5:242-248, May 1984.
5. Conte, J. E., Jr., Nadley, W. K., and Sande, M.: Infection-control guidelines for patients with the acquired immunodeficiency syndrome (AIDS). N Eng J Med 309:740-744, Sept. 22, 1983.
6. Searle, E. S.: Knowledge, attitudes, and behavior of health professionals in relation to AIDS. Lancet 1:26-28, Jan. 3, 1987.
7. McCray, E.: Occupational risk of the acquired immunodeficiency syndrome among health care workers. N Eng J Med 314: 1127-1132, Apr. 24, 1986.
8. Stricof, R. L., and Morse, D. L.: HTLV-III/LAV sero-

- conversion following deep intramuscular needlestick injury. *N Eng J Med* 314:1115, Apr. 24, 1986.
9. Needlestick transmission of HTLV-III from a patient infected in Africa. *Lancet* 2:1376-1377, Dec. 15, 1984.
10. Oksenhendler, E. et al.: HIV infection with seroconversion after a superficial needlestick injury to the finger. *N Engl J Med* 315:582, Aug. 28, 1986.
11. Shouldice, E. E., and Martin, C. J.: Wound infections, surgical gloves and hands of operating personnel. *Can Med Assoc J* 81:636-640, Oct. 15, 1959.
12. Russel, T. R., Roque, F. E., and Miller, F. A.: A new method for detection of the leaky glove. *Arch Surg* 93:245-248, August 1966.
13. Denes, A. E., et al.: Hepatitis B infection in physicians. *JAMA* 239:210-21, Jan. 16, 1978.
14. Nardt, F. et al.: Hepatitis B virus infections among Danish surgeons. *J Infect Dis* 140:972-974, December 1979.
15. Hirsch, M. S. et al.: Risk of nosocomial infection with human T-cell lymphotropic virus III (HTLV-III). *N Engl J Med* 312:1-4, Jan. 3, 1985.
16. Weiss, S. N. et al.: HTLV-III infection among health care workers. Association with needle stick injuries. *JAMA* 254:2089-2093, Oct. 18, 1985.
17. Centers for Disease Control: Update: prospective evaluation of health care workers exposed via the parenteral or mucus-membrane route to blood or body fluids from patients with acquired immunodeficiency syndrome, United States. *MMWR* 34:101-103, Feb. 22, 1985.
18. Centers for Disease Control: Update: acquired immunodeficiency syndrome and human immunodeficiency virus among health-care workers. *MMWR* 37:229-234, 239, Apr. 22, 1988.
19. Centers for Disease Control: Update: human immunodeficiency virus infections in health care workers exposed to blood of infected patients. *MMWR* 36:285-289, May 22, 1987.
20. Centers for Disease Control: Summary: recommendations for preventing transmission of infection with human T-lymphotropic virus type III/lymphadenopathy-associated virus in the workplace. *MMWR* 34:681-685, 691-695, Nov. 15, 1985.
21. Centers for Disease Control: Recommendations for prevention of HIV transmission in health-care settings. *MMWR* 36:1S-13S, Aug. 21, 1987.
22. Gerberding, J. L.: Recommended infection-control policies for patients with human immunodeficiency virus infection. *N Eng J Med* 315:1562-1564, Dec. 11, 1986.
23. Conte, J. E.: Infection with human immunodeficiency virus in the hospital. *Ann Intern Med* 105:730-766, November 1986.
24. American Medical Association: Ethical issues involved in the growing AIDS crisis. Report of the Council on Ethical and Judicial Affairs, Nov. 12, 1987.
25. Gordin, F. et al.: Hospital workers' knowledge, behavior and attitudes toward AIDS. Communication 213. Program Abstracts, Second International Conference on AIDS, Paris, France, June 23, 1986.
26. Reed, P., Wise, T. N., and Mann, L. S.: Nurses' attitudes regarding acquired immunodeficiency syndrome (AIDS). *Nurs Forum* 21:153-156, April 1984.
27. Richardson, J. L., Lochner, T., McGuigan, K., and Levine, A. M.: Physician attitudes and experience regarding the care of patients with acquired immunodeficiency syndrome (AIDS) and related disorders (ARC). *Med Care* 25:625-685, July 1987.
28. Kelly, J. A. et al.: Stigmatization of AIDS patients by physicians. *Am J Public Health* 77:789-791, July 1987.
29. Centers for Disease Control: Recommendations for preventing transmission of infection with human T-lymphotropic virus type III/lymphadenopathy-associated virus during invasive procedures. *MMWR* 35:21-23, Jan. 17, 1986.
30. Institute of Medicine, National Academy of Sciences: *Confronting AIDS. Directions for public health care and research.* National Academy Press, Washington, DC, 1986, pp. 153-155.
31. Plumeri, P. A.: The refusal to treat: abandonment and AIDS. *J Clin Gastroenterol* 6:281-284, June 1984.
32. Current opinions of the Council on Ethical and Judicial Affairs of the American Medical Association, 1986. Chicago, IL, 1986, p. ix.
33. Charap, M. N., Levin, R. I., and Weinglass, J.: Physician choices in the treatment of angina pectoris. *Am J Med* 79:461-466, October 1985.
34. Sobal, J. et al.: Physicians' beliefs about the importance of 25 health promoting behaviors. *Am J Public Health* 75:1427-1428, December 1985.
35. Orleans, C. T., George, L. K., Noyt, J. L., and Brodie, H. K. H.: How primary care physicians treat psychiatric disorders: a national survey of family practitioners. *Am J Psychiatry* 142:52-57, January 1985.