

Wearing of Caps and Masks Not Necessary During Cardiac Catheterization

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Although cardiac catheterization-related infections are rare, caps and masks are often worn to minimize this complication. However, documentation of the value of caps and masks for this purpose is lacking. We, therefore, prospectively evaluated the experience of 504 patients undergoing percutaneous left heart catheterization, seeking evidence of a relationship between whether caps and/or masks were worn by the operators and the incidence of infection. No infections were found in any patient, regardless of whether a cap or mask was used. Thus, we found no evidence that caps or masks need to be worn during percutaneous cardiac catheterization.

Key words: infection prevention and control; heart catheterization, adverse effects; percutaneous catheterization

INTRODUCTION

Cardiac catheterization, being an invasive procedure, can produce the complication of infection, either local or systemic, although fortunately this is rare [1-3]. Traditionally, physicians performing cardiac catheterization have worn both caps and masks in an attempt to reduce the likelihood of a procedure-related infection. However, evidence that wearing these articles indeed accomplishes this goal is lacking. Thus this prospective view was organized to address the issue.

METHODS

Between October, 1987, and August, 1988, questionnaire sheets were prepared by the Cardiac Catheterization Laboratory nurses of our hospital for each adult undergoing percutaneous left heart catheterization procedures, excluding electrophysiologic testing. The nurses also recorded whether caps and/or masks were worn by each physician performing the procedures. One attending physician and one cardiology fellow participated in each case, variably interchanging positions as primary operator and assistant. Thus two physician-operator experiences were recorded for each patient. No direction was given to the physicians about whether to wear caps or masks, and they were free to elect their own practices in this respect. During this period, the Catheterization Laboratory nurses and technicians did not routinely wear caps or masks and, after explanation of the study, expressed no concern with physicians not doing so.

A minimum of 5 days after each catheterization procedure, the patient was telephoned and questioned on

how he or she was feeling. Any complaints or comments were recorded. After this open-ended question, the patient was asked three specific questions designed to screen for possible catheterization-related infection: 1) "Did you experience pus from the place the tube was put in your skin?" 2) "Did you experience fever or chills?" 3) "Did you experience worsening discomfort at the place the tube was placed in your skin?" All details of any positive responses were recorded. If after a minimum of four attempts to reach a patient by telephone no response was obtained, a letter was mailed asking the same questions with a return-addressed, stamped postcard provided for responses. Any patient responses suggesting a possible infection were further investigated by medical record review, interview of referring physician, and/or reinterview or reexamination of the patient.

RESULTS

We analyzed 504 sequential cases with patient questionnaire responses, each with two operating physicians, yielding data for 1,008 patient-operator exposures. The cap and mask experience is detailed in Table I. Primarily, operators wore either both cap and mask or

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TABLE I. Cap/Mask Wearing by Questionnaire Response

	Complaints reported by patient	
	No	Yes
Cap not worn, mask worn	28	3
Mask not worn, cap worn	106	4
Neither cap nor mask worn	424	27
Both cap and mask worn	396	20

neither. There was no pattern regarding whether both operators at a case covered face and hair similarly. Attempts were made to contact 633 patients, yielding a response rate of 80%. Of responders, 27 (5.4%) answered "yes" to one or more of the screening questions for possible infection. (There were 32 "yes" responses; five patients listed two complaints). These responses are listed in Table II. In none of these patients was evidence of infection found after chart review, interview of referring physician, and/or reinterview or examination of patient by a physician. Typical explanations of positive responses to the questionnaire included patient confusion between hematoma/contusion and infection, chills and fever from documented urinary infection or cardiac surgical infection, pain during local compression for hemostasis, confusion between serous drainage and purulent drainage, angina, and misunderstanding of the questions. During the time of the study, no cases of suspected catheterization-related infection were brought to the attention of the Director of the Catheterization Laboratory or the Divisional Quality Assurance Committee.

DISCUSSION

Although it has been common for physicians performing cardiac catheterizations to wear both caps and masks for infection prophylaxis, no data supporting this practice are available. In recent years, many laboratories have ceased requiring the wearing of caps and/or masks but have not published their experiences in terms of possible infection rate change. Leaman and Zelis reported in 1983 a survey of 250 catheterization laboratories' infection experiences and analyzed these data by whether caps and/or masks were required of the "personnel not involved with catheter manipulation" [4]. They found no significant difference in infection rates of 53,578 percutaneous catheterizations between cases when caps or masks were required and cases when they were not required (with a rate less than 0.1% in all groups). Their findings were similar for 55,976 cases involving a cutdown, except the infection rates were uniformly higher (approximately 0.6%). However, this study did not report the infection rates relative to

TABLE II. Patient Complaints From Questionnaire

Question ^a	No. responses	Cap/mask worn?				Total
		No cap	No mask	Neither	Both	
Pus?	2	0	0	2	2	4
Fever or chills?	8	1	2	8	5	16
Discomfort?	22	2	2	22	18	44
Total	32	3	4	32	25	64 ^b

^aFull question detailed in text.

^bTotal of 32 responses (five patients listed two complaints) × 2 physician-operators per patient.

requirements for *operator* wearing of caps and/or masks. In this study, we found by a prospective review of the experience in our institution's catheterization laboratory that whether caps or masks were worn by the operators performing the (percutaneous) procedures had no effect on the apparent infection rate, with no catheterization-related infections being found in any patient. Thus these data indicate that a requirement is not necessary for those performing cardiac catheterizations percutaneously, and this laboratory no longer has such a requirement.

This study did not analyze procedures involving cut-downs, because very few of them were done. Since deep incisions are left open for a significant duration during such procedures, then are fully closed, it would seem prudent to continue the practice of wearing caps and masks when employing cutdowns unless data indicating the contrary are produced.

This study might conceivably have missed minor infections with evidence not recognized by the patients since patients' reports were relied upon; however, we believe that any such minor infections, if present, would not have contributed adversely to the patient's welfare. It is possible that a larger experience than the 1,008 patient-physician operator contacts evaluated in this study may have yielded evidence of infections, but the chance of finding significantly different rates between cap/mask groups seems very unlikely.

Although very minor cost savings would result, the chief benefit of not wearing caps and masks during cardiac catheterization is operator comfort. Additionally, it is likely that some patients would appreciate the reassurance of being able to see their physician's face during the procedure. Of interest was that, although many of the physicians welcomed the opportunity not to wear caps and masks at the beginning of the study, as the study progressed and the awareness of AIDS risk from blood exposure increased, progressively fewer physicians performed catheterization without at least a mask.

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