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## Preparation of neuroradiologic procedures: a questionnaire.

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# Preparation for Neuroradiologic Procedures: A Questionnaire

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A questionnaire was sent to members of the American Society of Neuroradiology (ASNR) to determine how they prepared themselves and their patients for the standard neuroradiologic procedures of myelography and cerebral angiography. Of the over 700 questionnaires mailed, 418 were returned; 209 were from physicians primarily in academic neuroradiology practice and 209 from private practice neuroradiologists. These 418 neuroradiologists obtained 144,955 myelograms and 154,770 cerebral angiograms the previous year. The questionnaire, with 22 questions, attempted to ascertain both the neuroradiologist's personal preparation for myelography or angiography as well as that of his patient. Neuroradiologists were asked to answer whether they always, usually, or almost never prepared themselves or their patients in a certain manner before myelography or angiography. Their responses were recorded as percentages. There was no significant difference between the answers provided by physicians in private practice versus academic practice, so these responses were recorded together (table 1).

## Results

### *Questions 1, 2, and 3—Scrubbing Up*

Neuroradiologists almost never perform a full surgical scrub before routine myelography or angiography. A full surgical scrub is occasionally done at the prospect of a long, difficult interventional procedure.

### *Questions 4–6—Attire*

More than half of the neuroradiologists polled usually donned a scrub shirt before routine angiography or myelography. Few, however, opted to put on scrub pants and even fewer shoe covers. Some of those who reported wearing scrub shirts did so only to keep their street clothes from becoming wrinkled or soiled.

### *Questions 7 and 8—Gowning Up*

More than three-fourths of the neuroradiologists put on a sterile gown before performing cerebral angiography with most preferring a wraparound garment. Less than 25% of the same group wore a sterile gown while performing myelography. Most neuroradiologists queried wore the gown during angiographic procedures to prevent contamination of the guide wire. Therefore, many of them degowned after the catheter was in place. They also frequently gowned for long or therapeutic-type procedures such as embolizations and angioplasties. Many commented that a sterile gown was no longer sterile once its wearer left the immediate vicinity of the angiographic table.

### *Questions 9–12 and 19—Radiation Protection*

As would be expected, all neuroradiologists wore a lead apron while performing myelography or angiography. The wraparound-type lead apron was not preferred as it was too heavy. On the other hand, thyroid shields were not worn by 90% of the neuroradiologists nor were special protective glasses used by most. Most neuroradiologists believed that regular glasses did provide some radiation protection as well as shielding their eyes from the toxic glues used in embolization procedures.

### *Questions 13–18—Gloves, Caps, and Masks*

Most of the respondents did wear surgical gloves for angiography or myelography, but very few wore double gloves. Somewhat fewer than half washed the gloves before myelography, whereas two-thirds of the neuroangiographers did remove the talc before the procedure. Some reported that washing gloves was an ineffective way to remove the talc, whereas others only washed their gloves before embolization procedures. "Double-gloving" was reserved for those patients

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TABLE 1: Responses by Neuroradiologists Concerning Preparations for Myelography and Cerebral Angiography

Question No., Question	Myelograms (%)			Angiograms (%)		
	A	U	N	A	U	N
Do you:						
1, Scrub up before a neuro procedure . . . . .	7	6	87	17	11	72
2, Scrub more than 5 min with surgical soap . . . . .	1	1	98	3	4	93
3, Do a full scrub similar to the OR . . . . .	1	1	98	7	3	90
4, Wear a scrub shirt . . . . .	33	22	45	54	15	31
5, Wear scrub pants . . . . .	8	6	86	18	7	75
6, Wear shoe covers . . . . .	4	2	94	7	4	89
7, Wear a "front side only" sterile gown . . . . .	5	2	93	18	4	78
8, Wear a "wraparound" sterile gown . . . . .	16	3	81	65	7	28
9, Wear a "front side only" lead apron . . . . .	76	9	15	78	7	15
10, Wear a "wraparound" lead apron . . . . .	15	4	81	17	5	78
11, Wear a thyroid shield . . . . .	5	3	92	7	3	90
12, Wear protective glasses . . . . .	15	7	78	17	10	73
13, Wear gloves . . . . .	94	1	5	94	1	5
14, Wear double gloves . . . . .	3	1	96	3	2	95
15, Wash your gloves off . . . . .	33	11	56	53	14	33
16, Wear a cap . . . . .	8	2	90	20	4	76
17, Wear a mask . . . . .	14	4	82	21	5	74
18, Wear a double mask . . . . .	1	0	99	1	0	99
19, Wear additional lead protection . . . . .	2	1	97	3	1	96
20, Shave around the puncture site . . . . .	55	21	24	95	2	3
21, Use a steri-plastic drape . . . . .	52	8	40	66	6	28

Note.—418 physicians responded to the questionnaires; 209 were primarily in private practice and 209 were primarily in academic practice. They had obtained 144,955 myelograms and 154,770 angiograms during the preceding year. When asked if they thought extensive precautions reduced the infection rate, 80% said no and 20% said yes. A = almost always; U = usually, N = almost never; OR = operating room.

with suspected hepatitis. Wearing caps was uniformly unpopular for the myelographers, and a head covering was not worn by more than three-fourths of the neuroangiographers. Likewise, wearing masks was almost as unpopular, and almost no neuroradiologists wore double masks. A mask was worn if the neuroradiologist had an upper respiratory infection, the patient was septic, or a biopsy or interventional procedure was to be performed. Some of those neuroradiologists who routinely wore caps and masks did so to "look sterile" to keep the curiosity seekers away.

#### Questions 20 and 21—Puncture Site Preparation

Almost all of the neuroradiologists shaved around the puncture site before cerebral angiography and three-fourths shaved the back before lumbar puncture. Steri-drapes were popular for both procedures. Groins were not shaved if the patient was a possible candidate for a femoral popliteal graft.

#### Question 22—Infection Reduction

To the most important question, "Do extensive precautions reduce the infection rate?", the neuroradiologists replied four to one that they did not. Further, extensive precautions were not cost-effective. Several commented that in some European countries, these same neuroradiologic procedures are performed without gowns or gloves, but with meticulous skin preparation and compulsive hand scrubbing. The physicians advocating this technique touched only the needle hub. In the opinion of many, preparation of the puncture site was most important. Meticulous scrubbing with surgical soap and/or

iodine antiseptic was quite helpful in preventing infections at the puncture site. Neuroradiologists did believe extra vigilance should be maintained for intravenous examinations. The most extensive precautions are indicated in patients undergoing embolization, because of both the length and complexity of the procedure. The introduction of foreign material into the vascular tree can easily be followed by infection if meticulous technique is not used. Likewise, the puncture of femoral grafts, not unavoidable in certain circumstances, is also a source of increased risk for infection. Likewise, diabetic patients are more susceptible to infection, as are patients with artificial heart valves. Immunosuppressed patients require meticulous technique as their resistance to iatrogenic infection is quite low.

#### Summary

Responses to a questionnaire sent to members of the ASNR indicated that most neuroradiologists do not believe extensive precautions reduce the infection rate for the routine patient undergoing myelography or femoral cerebral angiography. Most neuroradiologists queried do not routinely perform a surgical scrub before each procedure. Most wear sterile gloves and gowns, but not caps or masks. They do prepare the puncture site in a meticulous manner. Concern was expressed for the likelihood of causing infection in patients undergoing extensive procedures such as angioplasty or embolization, puncturing femoral grafts, or in the presence of artificial heart valves. The increased likelihood of incurring infections in diabetic or immunosuppressed patients was also expressed. In these patients, meticulous surgical technique was deemed mandatory.