JNM
COMMENTS AND PERSPECTIVES

Screening ^{18}F-FDG Whole-Body Scanning: *AWESOM*-PET or *FALSPOS*-PET?

How should we respond to a referring physician who asks, "If my patient wants a screening whole-body PET/CT scan, and is willing to pay for it, should I order one?" Although it has been noted that "to practice Medicine is to be continually faced with critically important decisions, armed only with woefully inadequate information with which to make them" (*1*), it may be equally true that to practice nuclear medicine is to be continually bombarded with partially informed questions and expected by our colleagues and patients to be able to comment intelligently upon them.

Two independent groups of investigators, one in Japan (*2*) and one in Taiwan (*3*), have published results obtained from PET or PET/CT scans in sizable samples of asymptomatic individuals. The results are in remarkable agreement with respect to the number of actual cancers found to be positively identifiable by PET for a given population size—36 of 3,165 subjects in the Japanese series (1.14%) and 38 of 3,631 subjects in the Taiwanese series (1.05%). In neither study was it clear, however, how many of those cancers would have remained undiscovered without PET but with the other screening modalities actually used or recommended for those participants. It was not clear how many total false-positive findings occurred in these series (although Yasuda et al. (*2*) did document 5 surgical procedures precipitated by false-positive findings, and the Taiwanese investigators had previously reported 24 false-positive ^{18}F-FDG PET results (*4*) occurring in a series one third the size of their more recent series), nor were there quality-of-life indicators to capture the anxieties provoked by them or, conversely, quelled by negative findings. Neither study included a control group or measured actual clinical impact on morbidity and mortality.

In the absence of definitive data, arguments both for (*5*) and against (*6*) the use of PET for oncology screening have recently been summarized, similarly to those that have been raised in the context of whole-body CT (*7,8*). In opposition to PET screening, Weckesser and Schober (*6*) argue that the literature suffers from inadequate information on non-PET screening findings, poorly defined inclusion criteria, unsatisfactory gold standards, and the absence of prospective randomized trials. They also express concerns about creating a false sense of security with negative results and about the risk posed by unnecessary radiation exposure. They further point to the lack of cost-effectiveness data, as the cost of the scans themselves represents a kind of risk, at least to the society or individual paying for them. In support of screening, Ide and Suzuki (*5*) note that in 10

years of experience with cancer screening of nearly 40,000 asymptomatic individuals in Japan, most cancers identified were PET positive, including 3 of 5 cancers in men and 4 of 5 cancers in women (for whom the overall rate of cancer was also higher). With respect to the health risk posed by radiation exposure, they state that "for cancer screening, radiation exposure should be taken seriously," but "if screening is limited to the older generation, the additional radiation dose at this level will not be a big issue."

Another advantage of limiting screening to the "older generation" would be their higher overall prevalence of cancer, which, by Bayesian calculations, would increase the ratio of expected true-positive to false-positive findings. The same statistical considerations apply to limiting screening to female subjects, given their higher overall rates of cancer and of cancer detection with PET, as noted by Ide and Suzuki (*5*) and Yasuda et al. (*2*). For those who believe there is some legitimate (if not entirely proven) role to be played by screening PET, based on the benefit and risk considerations, that role should perhaps be directed toward those patients who also have financial resources such that paying for the scans would not in itself constitute an unduly adverse event. . . for example, screening PET focused on Asymptomatic Women who Elect to be Screened when Older and Monetarily secure (AWESOM).

There is, however, another risk to proceeding down this road that is less often discussed—a risk not to the patient but to our profession. For years, nuclear medicine physicians have labored under the dyslexic shingle of "Unclear Medicine," which PET (and especially PET/CT) may have helped finally to fade. The success of our field despite the visually sharper images acquired in conventional radiology is a testament to the fact that "Unclear" may have applied to the resolution of the images but not to the perceived value of acquiring them, in that they provide a unique dynamic view of underlying physiology and biochemistry. To what extent, then, would we risk damaging the credibility of our profession by promulgating a procedure whose clinical value is, at best, unclear? For those whose concerns about the potential ratio of false-positive to true-positive findings are unassuaged by even the demographically narrowed subpopulation to which AWESOM-PET would be directed, a more acceptable designation might be something along the lines of, Frankly Acknowledging the Limitations of Screening People without Overt Signs/Symptoms (FALSPOS) PET. Although it appears inevitable that PET will continue to be used for both well-documented and more experimental indications, however each of us employs it our professional integrity will best be preserved by honest, balanced communication with our referring physicians and patients about its potential promise and limitations.

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