Unnecessary x-rays: Occurrence, disadvantages and side effects

Sir,

I read with interest an excellent review article "Unnecessary x-rays: Occurrence, disadvantages and side effects" written by Dr. Abd El Bagi et al.[1] This paper has timely raised the growing concern among physicians regarding the serious problem of unnecessary use of x-rays.

Over the past 2 decades a vast new armamentarium of diagnostic techniques has revolutionized the practice of medicine. The entire human body can now be imaged in exquisite anatomical detail. The number of diagnostic radiologic procedures is rapidly increasing. In such a scenario there is worldwide solicitude of overutilization of diagnostic radiology with its own disadvantages and side effects.

There are various factors that affect the physicians decisions to order radiographs i.e. medicolegal, lack of information, less physician effort, patient demands and fear of uncertainty. Radiographic studies are at times ordered for medicopsychological rather than strictly medical indications. Many patients harbor a magical faith in the capabilities of x-rays. Such patients may come to the hospital with the expectations that radiographic assessment will form a part of their evaluation and they may be more readily assured by a set of negative radiographs rather than by an opinion based on clinical judgement. Such x-rayphilic patients deserve special attention. Other contributing factors are illiteracy and lack of health education especially in rural areas, and practice of 'defensive medicine' relatively more frequent in the larger proportion of expatriate physicians working in Saudi Arabia.

Dr. Abd El Bagi et al[1] explicitly explained the unnecessary use of x-rays in the majority of regions. However, I may add a few points on radiography of the extremities, which constitutes the most commonly used radiographic procedure.[2] It is found that up to 85% of patients with acute knee injuries undergo radiography;[3] however, only 6-12%[4] actually have a fracture identified. Stiell in his study found that 92% of knee radiographs ordered were negative for fractures.[3] Similarly, in acute ankle injuries, the fractures are present in no more than 15% of cases.[5] Estimates of patient charges for knee radiography ranges up to 1 billion $ annually.[4]

Recently, several guidelines in the form of clinical decision rules have been developed to help select all patients likely to have a clinical significant fracture from among all patients with specific orthopedic injury. Clinical decision rules are a means of standardizing clinical data in order to estimate the likelihood of a particular diagnosis or outcome in different clinical settings. The validity of various clinical decision rules eg Ottawa ankle rule,[6] Ottawa knee rule,[7] Pittsburgh knee rule[4] for the use of radiography in acute trauma has already been established. Implementation of Ottawa ankle rules has the potential to reduce the number of radiographs obtained by one third.[6] A recently completed implementation trial using Ottawa knee rule noted a 26% relative reduction in knee radiographs.[7] A prospective validation of the Pittsburgh rule with patients with knee injuries found sensitivity to be 100%, specificity 80% and a potential of 70% reduction in x-ray use.[4]

Our ultimate goal should be to decrease the number of unnecessary radiographs while maintaining a high standard of quality and safety. This can be achieved by 1. proper strenuous health care education of the patients. 2. update of the latest medical knowledge through journals, CME programs, seminars and conferences. 3. implementation of the established clinical decision rules for radiography. 4. local and national protocols for restrictive and proper use of radiography. The new technologies such as digital radiography and PACS (picture archiving and communication system) are expected to lead to cost savings and decreased radiation exposure to the patients in the future.

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Reply from the Author

We are grateful to Dr. Dargan for elaborately adding more facts concerning occurrence and disadvantages of unnecessary x-rays. He particularly highlighted further factors that affect the physician's decision to order radiographs. Moreover, he emphasized the importance of clinical decision rules and guidelines, which was a major conclusion in our paper. The example of Ottawa knee rules and the Ottawa ankle rules are worth mentioning because extremities and joint radiographs represent 34% of all x-rays.

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Neonatal Septicemia

Sir,

We have read with interest the article on Neonatal Septicemia recently published in your esteemed Journal.[1] We feel obliged to make the following comments, since the validity of some of the data presented is questionable, as these may have escaped the attention of your expert referees. We agree entirely with the authors that it is important to review periodically neonatal septicemia in order to detect shifts in causative pathogens and the antibiotic susceptibility patterns in each locality. Unfortunately, the microbiological techniques used in the study were not stated at all. In the first instance, the blood culture system used, such as Bactec, Bact/Alert or Sigma Oxoid, etc was not stated. Were pediatric bottles used for collection of the blood cultures? Were blood cultures repeated when the significance of the isolates could not be determined? What incubation protocol was used, 5 days, 7 days or longer? What identification system of isolates was used, API, biochemical or other systems? What technique of susceptibility was used? Stokes method, Kirby Bauer, tube dilution method or some other method? Were suitable controls used for the susceptibility testing and what criteria were used to determine sensitivity or resistance of an isolate? Without this information it is difficult to accept these findings and attempt to compare them with those in published literature. More disturbing is the data presented in Table 4 which depicts the sensitivity of the isolates to various antibiotics. Firstly, it is stated in this Table that 25% of the Pseudomonas isolates were susceptible to vancomycin. Most microbiology laboratories will not bother to test Pseudomonas isolates against vancomycin, since it is well known that vancomycin is ineffective against gram negative bacilli. Secondly, the high resistance of the Pseudomonas isolates to gentamicin and amikacin (34% and 37%) is most unusual and calls for concern as it is contrary to findings elsewhere in the Kingdom. We wonder if these organisms could be Stenotrophomonas maltrophilia or Borkholderia cepacia? If these resistances are true, they therefore suggest nosocomial infections acquired in the Unit, rather than community acquired organisms. This therefore, questions the infection control practices of the Unit, with highly resistant organisms circulating in the Unit. Thirdly, the resistance of E.coli to gentamicin, amikacin and piperacillin is rather high and alarming compared to ceftriaxone. Fourthly, of the 4 Group B Strepptococci (GBS) isolated, only 66% were sensitive to vancomycin. As far as we are aware, no vancomycin resistant GBS has been reported anywhere. Fifthly, all the coagulase negative Staphylocci (CNS) were resistant to cloxacillin, yet 33% of them were susceptible to cefotaxime and ceftriaxone. This is a rather unusual finding. Sixthly, piperacillin is well known to be active against enteric gram negative bacilli including Pseudomonas and Klebsiella, yet the authors record only 50% sensitivity of Klebsiella species to piperacillin, a most unusual finding. Finally, more disturbing and possibly erroneous, is the finding that 100% of the Serrata spp isolated were sensitive to cloxacillin, an antibiotic ineffective against gram negative bacilli.

Among the objectives of the authors, one was to compare findings with those in published literature. Only 2 studies on neonatal septicemia in the Kingdom have been cited and discussed, yet there are several of these.[2-4] Most of these studies suggest that CNS is the most common isolate in neonatal sepsis rather than Pseudomonas. This increased incidence of CNS has been associated with the increased survival of very small premature infants with immature immune systems and with the introduction of invasive procedures for maintenance and monitoring.[5,6] Although antibiotic susceptibility testing is a major guide to therapy, it should not become misleading, and more confusing than helpful. It cannot be over emphasized that the changes in etiology and antibiotic susceptibility patterns should be regularly monitored in Neonatal Units and taken into consideration when selecting antibiotic treatment in neonatal septicemia. We would be charitable to speculate that these inconsistencies indicated above

were typographical errors which missed the attention of the authors and expert reviewers.

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Reply from the Author

We thank Professor Osoba, and Mr. Al-Mowallad for their comments on the paper. We have noted their comments on the details of suggested microbiology techniques. The details in the microbiological techniques might have enhanced the quality of the paper. It should however be noted that all the papers cited in this report, although limited in number, did not conform to such details in the microbiological techniques. If all the cited papers including ours had used their suggested details in microbiological techniques, the comparisons would have been much easier.

The paper was published because of some unusual findings such as the sensitivity of the isolates to various antibiotics, as has been noted by Prof. Osoba and Mr. Al-Mowallad, and the high occurrence of pseudomonas inspite of all efforts to identify and eradicate the sources of infection in the NICU. We are aware that increased incidence of CNS has been associated with increased survival of extreme preterm babies who have received intensive care including the introduction of invasive procedures as has been clearly noted in the paper. There were some typographical errors which the authors should not be held responsible for.

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Note from the Editors

An erratum has been issued in this case, in the October issue of Saudi Medical Journal (Volume 20 (10): 796). However, the Editor emphasizes that none of the issues raised by Prof. Osoba and Mr. Al-Mowallad are typographical errors.

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