Defensive medicine and overutilization of imaging – an issue of radiation protection

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Defensive medicine is a serious and prevalent challenge in modern medicine and is a major cause of overutilization of imaging, i. e., its application with a low probability to improve patient outcome. The problems are concerns of missing unexpected or rare findings and fear from litigation; other reasons are avoidance of an inaccurate diagnosis or keeping costs low. Defensive ordering of diagnostic tests may additionally lead to overdiagnosis, which is the detection of new findings not associated with a substantial impact on health which in turn may cause further unnecessary actions.

In this issue of the *Wiener klinische Wochenschrift* Lambert L et al. describe a significant increase of emergency cranial CTs in a trauma setting compared to CTs of other body regions. They conclude that this cannot be entirely justified by clinical need as they observed that the highest increase occurred when the number of beds in this hospital was reduced by 21 % [1]. The cost reduction from the smaller number of beds outweighed the higher costs for CT, but the radiation exposure to patients increased. In a similar study, Chen J et al. report that at a level I trauma center 38 % of CT scans were ordered out of defensive purposes [2]. Remarkably, in that study the rate of significant findings among CT scans obtained defensively was 6 %. Tong GE et al. calculated a doubling of CT scans from 3.51 % in 2005 to 7.17 % in 2013, observed in over 8.5 million Californian patients with minor trauma [3]. Based on a survey among orthopaedic surgeons, trauma surgeons and radiologists in Austria, Osti and Steyrer found that hospital admission with

65 % and CT examinations with 32 % were the most important consequences of defensive medicine, thus causing an enormous workload in hospital settings [4]. Taking these studies into consideration, aspects of dose reduction play an increasing role in defensive medicine and the question comes up what we can learn from the recent developments in radiation protection to optimize the process of ordering diagnostic tests.

In Europe, referral guidelines for imaging are part of the continuously improving quality and safety framework of the EURATOM Basic Safety Standards (BSS) Directive [5]. These new standards reflect a holistic safety concept with the potential to change the “culture” of our clinical work substantially in the sense of predictive, personalized, preventive, and participatory (P4) medicine. Many measures developed to reduce patient dose may be applied for reducing the negative effects of defensive medicine. One is that the motivation for ordering a diagnostic test is differentiated into direct clinical need or a forensic, scientific, or other purpose. Labeling the imaging request in such a form might have the potential for gaining more transparency and optimization. Such labeling could easily be performed on the referral sheet by grading the pretest probability and documenting the urgency for imaging, thus improving the administration and the communication between departments. It would increase the awareness of the inherent problems of overutilization of imaging and more reliable data for outcome research could be yielded. Next, in the BSS directive education, training and provision of information is requested. In defensive medicine, many aspects of a decision remain unsaid and are implied in or covered by meaningful arguments. This could be addressed in such training programs and computerized clinical decision support systems may provide further improvements. Radiation protection

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is oriented on the “outcome of patient care through structured review, whereby medical radiological practices, procedures and results are examined against agreed standards for good medical radiological procedures, with modification of practices, where appropriate, and the application of new standards if necessary” [5].

Outcome orientation has generally been underestimated in the research for validating diagnostic examinations. Such studies are more complex than a simple comparison between two tests and need an advanced research infrastructure. But health outcomes research is essential for high value patient care and the methods used in this field are of help in developing strategies to reduce defensive medicine and overdiagnosis. An important aspect of such type of research is to define when and if a new test merits further evaluation so that it is timely available at the point of care.

Radiation protection is strictly controlled in the European Union and the new BSS directive may have an influence on defensive medicine by not only reducing the dose from ionizing radiation, but also the workload caused by unnecessary imaging studies and the consequences arising from them. However, as we do not practice medicine in an ideal world, we have to accept some uncertainty in our clinical reasoning. As long as our medical decisions strongly base on intuition and only in part on the laborious, slow and

expensive process of systematic diagnostics—and this will not change in the near future—defensive medicine will be an indispensable part of our clinical work. But its extent should be quantified, evaluated and curtailed.

Conflict of interest F. Kainberger declares that he has no competing interests.

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