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The past, present and future of X-ray Computed Tomography (I)

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Computed Tomography (CT) is considered a mature technology as it did not change significantly since the advent of multislice devices (2000s) and helical acquisitions (1990s). However, innovations in CT are still happening. After a brief history of CT, the evolution of this imaging modality during the last few years will be reviewed from technological, social and medical perspectives. On the technological front, CT can nowadays rely on unprecedented computing power, allowing the execution of advanced reconstruction algorithms in a reasonable time. Massively parallel Graphics Processing Units (GPUs), for instance, allow the use of complex physical models in iterative reconstruction schemes. These approaches can yield better images acquired at lower patient doses. From a health physics perspective, the steadily increasing number of CT studies performed each year has drawn the attention of the media and radiation safety authorities. CT manufacturers, well aware of this situation, nowadays propose technologies aiming at reducing the radiation dose to the patient. These technologies will be reviewed and discussed. From a medical perspective, CT nowadays allow new applications thanks to technological developments. The case of dual-energy imaging will be reviewed and discussed. Finally, current research avenues in CT will be reviewed, from technological and medical perspectives.

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