

Clinical validation of a dose reduction study in paediatric abdomen MSCT scanning.

A. Ciccarone¹, G. Zatelli², S. Mazzocchi², C. Fonda¹.

1 - Fisica Sanitaria, Azienda Sanitaria di Firenze, Firenze, Italia

2 - Radiologia, A.O.U. Meyer, Firenze, Italia

In our previous work an individual dose adaptation in abdomen of paediatric patients has been showed at the Meyer children hospital of Florence. For each kV really feasible in our MSCT scanner, a table of mAs versus abdomen thickness and width ratio has been developed only on the basis of water cylinder phantoms. The choice of the water arise by the fact that in pediatric patient the quantity of water inside the body is major than that of adult. In this way a reduction dose has showed with respect to the ordinary paediatric scanning protocol in use before and the same image quality has been preserved in the case of an optimized CT scanning technique of a standard adult patient of height 175 cm and weight 70 kg. However these results were only theoretical because relied on water phantoms. Now this work concerns the clinical validation of our dose reduction study on phantoms. So 50 examinations were acquired with the dose reduction scanning technique and scored randomly, without knowing weight and height of patient by three radiologists. These scores were compared with that of other 50 abdomen examination before dose reduction study. The scores refers to the noise perceived by radiologist and to the diagnostic quality of radiograph. As last, a score on the low contrast tissue separation between muscle and fat and a score on visibility of structure therein have been asked to the radiologists.

The same work has concerned the abdomen examinations with iodine contrast medium. In this study the score of each radiographs has been catalogued in four range of age, 0 – 1; 1 – 3; 3 – 8; 8 – 13 years. Aligned rank and Wilcoxon's signed rank tests were used for statistical analyses.

The table of modulating mAs with respect to the size of patient obtained with only water phantom study has been revised so that none reduced detection in low-visibility structures like fat or muscle or liver was evident. Nevertheless a reduction in CTDI of 30 % has been reached in our new scanning protocols refers to old ones. In this way it's possible to store, in our MSCT Philips Brilliance 40, the same image quality for the same patient size and then learn to the scanner the appropriate dose to leave at each patient inside the program of x-y modulation.