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## A new method for improvement of attenuation correction in cardiac imaging by SPECT system

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### Abstract

In nuclear medicine, studies of important tissues such as cardiac, the emitted photons from the cardiac before reaching the gamma detectors are attenuated and scattered by other tissues inside the thorax. Therefore, the quality and contrast of the image will be reduced. In this research, to improve the quality of cardiac images by SPECT system, the most convenient algorithms for attenuation correction were studied and assessed in the first step. Then the best method using the line source in Transmission Attenuation Correction (TAC) method was modified and the experimental data was obtained by using this new and modified method, cardiac phantom, Dual Head SPECT system and a line source of  $^{201}\text{Tl}$  with the activity of about 0.5 mCi. The data was collected and obtained in two steps: (1) Scanning the cardiac phantom and line source which was beside the cardiac phantom; this step involves using emission and transmission simultaneously. (2) Scanning the cardiac phantom in the absence of line source which means using emission data. Next, the suggested attenuation correction formula was used and the calculated attenuation coefficient for each pixel was calculated and applied to each pixel. Our results showed a nice improvement in contrast and visibility of the images by this simple and in improved expensive method. The advantages of this method include simplicity, the available radionuclide, improved accuracy, quality and contrast of the final image, and finally, cost – effectiveness. These advantages may help the nuclear medicine centers to improve their ability to detect the physiological and functional defects of the cardiac, especially in the elder and women patients.

**Keywords:** transmission attenuation correction, SPECT, cardiac studies

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