Purpose:Medical imaging techniques produce images containing a lot of information about the anatomical structures being investigated. This information is valuable for making correct diagnosis, choosing the most adequate therapy, and so on. The analysis of medical images has been performed visually by physicians. Recently a strong impulse has been given to develop automated or semi-automated systems capable of assisting physicians in this task. However, presence of noise and masking of structures, the variability of biological shapes and tissues, imaging system anisotropy etc. make the automated analysis of medical images a very hard task. With this objective, fractal based quantification of CT images of brain have been explored.

Methods:The most important properties of fractals are self-similarity, chaos and non-integer fractal dimension (FD). Self-similar means that structures are repeated at different scales of size. The fractal dimension gives a quantitative measure of self-similarity and scaling. Two trans-axial CT sections (one normal brain and one diseased brain) of different patients are included in this study. Both the images were in the digital form and of size 512 x 512 pixels. Each image was subjected to computation of fractal dimension (FD) by a fractal algorithm coded in C programming language.

Results:The results show that FD of normal brain and diseased brain images were 2.78 and 2.62 respectively. The difference in the FD values is an indicator that the texture of images is different from one another. Higher value of FD of normal image also indicates that it is relatively ‘smooth’ than the diseased brain image which is intuitively correct in the clinical situation.

Conclusions:The methodology adopted in this study will be useful as an automated and standardized tool in the hands of physicians for interpretation of CT images in different clinical environments. However, its relative effectiveness will depend on more data and clinical correlation.