

new optional Gamma Knife treatment planning software Gammaplan that can automatically superimpose isodose shell and medical imaging, the standard treatment planning software offered by the manufacturer is still the Kula system. Kula can only calculate the isodose distribution which has to be manually superimposed onto the hardcopies of medical imagings. Kula does not provide routine for coordinates and magnification factors calculation. The exact equations such as Eq(2) and Eq(5) can be implemented as PC-based software. The graphical method presented in this paper can be used to double-check against the computer program. Kula can hardcopy the isodose curve with stepwise magnification change of 0.01. The rounded error with this graphical method is 0.005 which is good enough for Kula. Target has 3-dimensional volume and its magnification factor varies from plane to plane, depending on the sagittal plane's X-coordinate and the coronal plane's Y-coordinate. The additional advantage of

the graphical method is instant read-out of the magnification factor at arbitrary planes.

## REFERENCES

1. M. Bergström, T. Greitz and L. Steiner, "An approach to stereotaxic radiography," *Acta Neurochir* 54, 157-165 (1980)
2. A. Wu, J. C. Flickinger, A. M. Kalend, A. H. Maitz and L. D. Lunsford, "Exact determination of the magnification factor for target lesions in a stereotactic frame," *Med. Phys.* 18, 804-805 (1991).
3. W. Guo, M. Lindqvist, C. Lindquist, K. Ericson, B. Nordell, B. Karlsson and L. Kihlström, "Stereotaxic angiography in gamma knife radiosurgery of intracranial arteriovenous malformations," *AJNR* 13, 1107-1114.
4. R. L. Siddon and N. H. Barth, "Stereotaxic localization of intracranial targets," *Int. J. Radiat. Oncol. Biol. Phys.* 13, 1241-1246 (1987).

## 放大率圖形計算法應用於動靜脈畸形瘤放射手術

蕭正英<sup>1</sup> 陳培勳<sup>1</sup> 王令瑋<sup>1</sup> 鍾文裕<sup>2</sup>  
郭萬佑<sup>3</sup> 潘宏基<sup>2</sup> 顏上惠<sup>1</sup> 陳光耀<sup>1</sup>

台北榮民總醫院 1 癌病中心和癌研究組 2 神經外科 3 放射線部

一個簡單又正確的放大率圖形計算法被發展出來應用於動靜脈畸形瘤自放射手術。這個圖形計算法適用於不同方位的正交血管攝影。本篇介紹此圖形計算法的數學模式及設計方法。我們建議利用此圖形計算法來複查電腦計算所得之放大率數據。

關鍵詞：立體定位頭架、正交放射線影像、放大率、立體定位放射手術