

Preface

In 1993 the author of this book published a short work on Gamma Knife surgery. At the time less than 20,000 patients had been treated world wide and there were only a handful of centres equipped with Gamma Knives. Since that time radiosurgery has exploded so that there are now over 250 machines installed world wide and over 500,000 patients have been treated with the Gamma Knife. Moreover, the machine itself has developed through several generations to its current model “Perfexion”.

The use of focused radiation to improve the sparing of normal tissue is now used outside the head. This means that there has also been a development of other methods for delivering stereotactic radiation than the Gamma Knife. The extent of this development was demonstrated in 2008 with the publication the first exhaustive text on radiosurgery embracing all its aspects. This was “Principles and Practice of Stereotactic Radiosurgery”, edited by Lawrence S. Chin and William F. Regine and published by Springer Verlag. This book marks a new departure, signalling as it does that radiosurgery is today truly a whole body concern.

Despite the publication of such a comprehensive text there remain several reasons for writing a book limited to just the Gamma Knife. These reasons are based less on the technology and more on the development of the modern medical milieu over the past 20 years.

Firstly, it is no longer possible for an individual hospital physician/surgeon to manage patients alone. The complexity of modern knowledge requires management with teams. This is mentioned in a little more detail in the final chapter. Nonetheless, the ultimate responsibility for the management of a disease should be in the hands of a specialist trained in the understanding of the disease and not by the method of treatment. Thus, neurosurgical diseases should be managed by neurosurgeons and neurosurgeons should all be familiar with radiosurgery. Even so the neurosurgeon will require the advice and guidance of radiologists, pathologists, oncologists, neurologists, nurses and in the case of the Gamma Knife physicists. This notion will be mentioned repeatedly in different contexts throughout the book as it is considered to be of prime importance.

Secondly, there is a vast literature on the management of different diseases using the Gamma Knife. This is by no means uniform in its opinions of indications for treatment and the technique of radiosurgery when that is deemed the treatment of choice. This book aims to provide a guide through the maze of varying opinions. It is not for the author to say which opinion is correct, though it is possible for him to state a personal preference. However, it is hoped that the differing opinions and their underlying reasoning are fairly presented so that the reader may make a balanced judgment.

This book is intended primarily for neurosurgeons in training and referring physicians including neurosurgeons. It is emphasized it is a book limited to intracranial disease and has thus been given the title *Gamma Knife Neurosurgery*. The relevant basic science aspects of intracranial radiosurgery are described.

To simplify access to information of interest for any given reader, the book is divided into three main parts. Firstly there is an outline of the scientific principles underlying radiosurgery. This part is concluded with an account of how the Leksell Gamma Knife has developed. Secondly, there is a short part, containing information directly related to the patients and how they experience the treatment. This part also contains comments on the impact of computer networks on clinical practice and the patient's experience. In the third part there is an account of current thinking on the commonest diseases treated in the Gamma Knife. At the end of the book there is a short concluding chapter indicating desirable directions of future interest and expansion.

In conclusion, the author would like to emphasise two points. Firstly, the reader's attention is drawn once again to the importance of radiation dose in the Gamma Knife treatment of diseases. The first question that must be asked when comparing results from one centre with those of another is – *what was the dose?* If this simple information is not available then assessment of the results is impossible. There are of course other variables which may be considered but dose is essential. The second point concerns choices of the best method for treatment. It is regrettable that different methods of treatment are viewed all too often as competitors. On reflection it seems that in reality different methods complement rather than compete with each other. Once again the allocation of patient management to teams of experts instead of individual physicians should help to make such competition and debate unnecessary.

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