

Book Reviews

Editor: Dr. Torsten Landberg, Department of Oncology, University Hospital, S-205 02 Malmö, Sweden

Hadrontherapy in Oncology

U. Amaldi & R. Larsson, eds.

Excerpta Medica, International Congress Series 1077, Elsevier, Amsterdam, 1994, 755 pp. (Available in the USA and Canada from Elsevier Science Inc, PO Box 945, Madison Square Station, New York, NY 10160-0757)

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This book contains the proceedings of the First International Symposium on Hadrontherapy in 1993 and includes about 80 papers. The title may indicate that the book only includes the use of exotic types of radiotherapy based on the use of large accelerators and this is certainly the case with some of the papers, but there is also useful information for most researchers in radiotherapy. The papers are generally of a high class.

The aim of the meeting, held in October 1993, was to get an overview and critical analysis of the present state of research and development in the field, i.e. in the clinical introduction of ion accelerator technology in cancer treatments. However, some other non-conventional treatment modalities are also discussed, e.g. photodynamic therapy and targeted radiotherapy.

Low-LET hadrontherapy, i.e. proton therapy (about 90 pages of text) was in 1993 carried out by 'no fewer than 13 centers throughout the world'. It is concluded in the introductory paper in this session that protons are not 'magic bullets' in the treatment of malignant disease. The advantage is instead the 'potential gains by use of a superior dose distribution'. Until 1993, about 12 000 patients were treated. There are, however, many restrictions in the techniques. For instance, until 1990 all proton beam treatments had been delivered with fixed beams, dictating that the patient be aligned to the beam. Furthermore, most of the research on particle accelerators used for clinical radiotherapy are relatively low-energy units, restricting the treatment depth. One paper in the report describes the most advanced facility in routine operation in Loma Linda, USA. The 360° rotating gantries and two fixed horizontal beam lines delivers proton beams from any angle while the patient is precisely and comfortably immobilized. Treatments began at the end of 1990; by January 1 1994, 732 patients had completed treatments. The book is a 'must' for those considering a proton project, as different plans for new facilities are outlined. There is convincing evidence that some dose distributions are superior to those possible to obtain with protons or electrons. However, the reader is left with a feeling that the texts are written by very involved researchers already convinced of all the advantages of protons. A comparison with the most advanced photon, electron or brachytherapy radiotherapy based on inverse dose and planning applying modern conformal therapy using modulated beams would be of interest.

High-LET hadrontherapy is today mainly carried out with neutrons. An interesting review paper was given by Richard & Wambersie. According to these authors, more than 20 000 patients have been treated with neutrons, and 20 facilities are in operation in 1994. They explain parts of the difficulties, when interpreting the results, with the poor technical conditions in which the first treatments were carried out. Their assumption is

that 10–15% of the patients today referred to radiotherapy would require high-LET radiotherapy and that the main problem is to develop a predictive test to find these patients. Their paper is thus fairly optimistic regarding a place for radiotherapy. However, it is well known that there are also other options—not covered in the text.

The experience with pions is summarized by Blattmann. Worldwide about 1 000 patients have been treated. It is interesting to note the conclusions that the 'initial hope to implement pions successfully in a hospital environment has definitively been given up'.

The heavy ion therapy during the BEVALAC (Berkeley) epoch was described by Castro. The experience from this facility is now transferred to HIMAC (Chiba-Shi, Japan) at present the only medically dedicated heavy ion accelerator in the world. This accelerator has recently been taken into clinical operation and is described by Kawachi et al. Further clinical experience will reveal if this will be a successful activity.

A major part of the book deals with accelerators for hadrontherapy (about 160 pages) and beam delivery (75 pages). Superb dose distributions are demonstrated with spot scanning at the Paul Scherrer Institute.

Boron neutron capture therapy (BNCT) is covered fairly extensively (60 pages). The programme sponsored by EU in Petten (the Netherlands) is a collaboration with 14 European countries. BNCT is not a new technique. Since 1968, the Japanese have treated more than 100 patients. It is planned in the first series to include 130 patients in the European programme, see paper by Gabel and Sauerwein.

Photon activation therapy and radionuclide therapy is together treated in 10 papers. One interesting possibility is the use of Astatine (^{211}At). This nuclide is produced with $^{209}\text{Bi}(\alpha, 2n) ^{211}\text{At}$ reaction using 28 MeV α -particles. Several cyclotrons in Europe can produce such α -particles which means that most centres can be reached with transportation within a few hours. This is of great importance as the half-life is only 7.2 h. ^{211}At decays by emission of one α -particle and at least six Auger and Coster-Kronig electrons per decay. Different possibilities with targeted radiotherapy is discussed in the paper.

In conclusion, the book gives an up-dated review of the research in the described fields and is highly recommended.

HANS SVENSSON
Umeå University
Umeå, Sweden

Paclitaxel in Cancer Treatment

W. P. McGuire & E. K. Rowinsky, eds.

Marcel Dekker, Inc., New York, Basel, Hong Kong, 1995

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USD 135.–

The taxanes, a new class of antineoplastic agents, were identified in the 1960s. In the late 1960s its broad activity and structure was described and in the 1970s its unique mechanism of action was elucidated. However, the initiation of clinical trials was delayed due to the limited drug supply from the natural resource, *taxus brevifolia*, and the early clinical trials were faced with significant toxicities such as hypersensitivity reactions. These problems, however, have now been significantly reduced and numerous clinical trials have now been published or are in progress.

This book includes 19 chapters on paclitaxel written by 40 authors, all but one American. The first 10 chapters give reviews

on the available data of the chemistry, molecular mechanisms, mechanism of resistance, preclinical studies on paclitaxel in combination with other cytotoxic agents and on interaction with radiation, pharmacology, safety profiles, dose and schedule issues and guidelines for administration. The last 9 chapters present the present status of paclitaxel, based upon data from phase II and III studies in the treatment of a variety of malignant diseases: ovarian cancer, breast cancer, non small- and small cell lung cancer, head and neck cancer, haematological malignancies, paediatric tumors, melanoma and other tumors. As the data from these trials have appeared the broad spectrum of activity has become apparent. The majority of the chapters are well written with logic composition and extensive bibliographies, which are up to date including references from 1994.

Numerous reports on paclitaxel are now being published in scientific journals and at conferences and the clinical part of the book will soon become historical. However, the book gives an excellent update of the available knowledge as of 1994 and is therefore recommendable to oncologists.

HANNING T. MOURIDSEN
Rigshospitalet,
Copenhagen, Denmark

Tamoxifen—Molecular Basis of Use in Cancer Treatment and Prevention

H. Wiseman
John Wiley & Sons Ltd., 1995
ISBN: 0471943169
GBP 29.95

The book announces tamoxifen as a drug with multiple pharmacological actions and gives a good description of the chemistry, pharmacology, metabolism and toxicology of this drug. The clinical use of tamoxifen for metastatic breast cancer, as adjuvant treatment for primary breast cancer, and in combination with chemotherapy and other endocrine therapies is shortly outlined. The use of tamoxifen in several other cancers is also described. The beneficial side-effects, including the protection against cardiovascular disease and osteoporosis and the harmful long-term side-effects with increased risk of endometrial cancer, liver cancer and retinopathy are discussed in relation to the use of tamoxifen in breast cancer prevention trials. The estrogen receptor-mediated mechanisms of tamoxifen action and modulation of oncogenes and growth factors are reviewed. The aspect of tamoxifen resistance is also mentioned. The last 100 pages of the book consider non-estrogen receptor mediated actions, including the interesting membrane-modulating action of tamoxifen which may result in changes in cell signalling and second messenger pathways leading to growth inhibition, and also explain the tamoxifen reversal of multidrug resistance. The strength of the book is the description of the multitude of possible actions of tamoxifen and the large number of relevant new literature references.

ANNE LYKKESFELDT
Kraeftens Bekaempelse
Copenhagen, Denmark

Current Cancer Therapies (1st edition)

J. M. Kirkwood, M. T. Lotze & J. M. Yasko, eds.
Current Medicine, 20 North Third Street, Philadelphia, PA
19106, USA, 1994, 344 pp.
ISBN: 1-878132-12-1
GBP 29.95

This is the first edition of a new book focusing on medical cancer therapy, edited at the Pittsburgh Cancer Institute, and with contributions by 51 American and two Australian authors. The major goal of the volume, as presented by the editors, is to 'present the most current information regarding the agents in current use, the protocols relevant to each of the malignant diseases, and the supportive care required to deliver advanced cancer therapy in a user-friendly concise, and consistent format'. With an easy-to-digest layout and with a generous amount of illustrative charts, tables, and comprehensive fact squares, this goal is at least partly achieved.

Consisting of four sections the book begins with an extensive overview of all agents used in medical oncology today, divided into the main groups, e.g., alkylating agents, antibiotic agents, hormonal agents. Mechanisms of action and resistance, pharmacokinetics, toxicities, etc. are described for each group and, additionally, every single agent is presented in further detail on one page each. An interesting chapter is devoted to the recent knowledge of biological agents, such as interferons, interleukin-2, retinoids and colony-stimulating factors.

The second section describes a selection of established treatment protocols in use, and is divided into 16 diagnosis-related chapters, each with a general introduction about the disease, but focused on treatment at different stages. These chapters are mainly well written and brief enough to allow a fast reading, and the uniform style and contents between the different authors and chapters are praiseworthy. The fact that American references and traditions dominate the picture may disturb the European reader to a certain extent, however. Every chapter in this section is completed by graphically well-presented treatment protocols, usually one page each. With only 68 protocols described in the book the list is far from complete. Thus, many protocols frequently used in Europe are lacking.

A short and good chapter on access devices, e.g., catheters, ports and pumps, is also very well illustrated. Finally, the book is ended by a very readable section called 'Supportive care' with ten different chapters on toxicity or complications such as 'malnutrition', 'myelosuppression', and 'cardiac toxicities'.

To conclude, this volume is recommended for its nice layout and comprehensive contents, dealing with most aspects of medical treatment of cancer today.

MIKAEL ERIKSSON
University Hospital
Umeå, Sweden