Modern Radiotherapy In Brain Tumours: Concepts and Techniques

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Rationale and objectives
In brain tumours radiotherapy still plays a major role. Innovative techniques providing high conformality as conformal photon therapy as well as particle therapy were increasingly introduced into this field.

Methods
We provide an overview over current treatment strategies. Additionally we present conformal techniques in radiotherapy as IMRT, tomotherapy, stereotaxy, cyberknife and particle therapy. Clinical experiences and characteristics of each technique will be discussed.

Results
Numerous photon techniques provide excellent conformality. However, any conformality is achieved by arranging multiple fields, thus spreading the low and medium dose to a large volume of the human body. This might matter clinically for highly sensitive tissue or in childhood when potentially increasing the risk for secondary cancer or other late sequelae. Only particle therapy can provide similar high conformality without increasing the irradiated volume. However, clinical data for all conformal techniques is spares. Especially in childhood, follow-up periods are short and cohorts are small so far. Today, only data for early toxicity is available, demonstrating the feasibility of these techniques.

Conclusion
Techniques providing high conformality are theoretically benefitial for CNS irradiation. However, more clinical data has to be collected to define its optimal use.