401 INVITED

Can We Consolidate Medical Response With Local Treatment

Abstract not received

Special Session (Tue, 27 Sep, 11:30−12:30)
Treatment of T1N0M0 Non-Small Cell Lung Cancer in Patients Who Are Not Candidates for Lobectomy

402 INVITED

Alternative Surgical Resections for Lobectomy

Abstract not received

403 INVITED

Role of Stereotactic Radiotherapy

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If non-small cell lung cancer (NSCLC) is detected at early stage, clinical outcome is favourable after lobectomy and systematic mediastinal lymphadenectomy with long term survival. However, about one third of the patients are medically inoperable and conventionally fractionated radiotherapy has been the standard of care for these patients. Stereotactic body radiotherapy (SBRT) has been first described about 20 years ago and is characterized by dose-intensified, hypo-fractionated irradiation: this aggressive irradiation has become possible by advanced radiotherapy technologies, which spare the normal lung tissue and confine the irradiation doses to the tumour.

Most relevant issues of clinical practice and outcome after SBRT will be discussed. Starting with patient selection, histopathological confirmation of disease should be performed; however, if this bears an unacceptable risk, the probability of treating a benign lung nodule is less than 10% after CT and FDG-PET staging. Additionally, FDG-PET is mandatory for nodal staging: the risk of nodal relapse is maximum 10% if contemporary FDG-PET staging had been performed. The effect of SBRT on pulmonary function is very small so that SBRT is safe even for patients with very poor pulmonary function; safety of SBRT has also been demonstrated for the elderly patient population >75 years old and patients with severe pulmonary co-morbidities. Regarding the technique of SBRT, most important aspects are full and consistent consideration of breathing induced tumour motion in treatment planning and delivery, highly conformal dose shaping and image-guided patient set-up.

All published retrospective and prospective studies consistently report excellent local tumour control rates of 90% and higher if sufficient irradiation doses of >100 Gy BED were used; this was achieved with toxicity grade $\geqslant$II of less than 10%. In retrospective and population-based analysis, it has been shown that the introduction of SBRT improved overall survival for medically inoperable patients and consequently, SBRT is considered as the treatment of choice for these patients. Additionally, SBRT seems to be at least equivalent to sublobar wedge resection in terms of oncological outcome offering a non-invasive treatment alternative. If SBRT was practiced in operable patients refusing surgery, overall survival compared well to surgical series; prospective studies are needed for defining the role of SBRT in the operable patient cohort.

Prospective phase II studies	Year published	Radiotherapy dose	2−3 year local control	2−3 year overall survival
Nagata et al.	2005	4 × 12 Gy	98%	75%
Baumann et al.	2009	3 × 15 Gy	92%	60%
Fakiris et al.	2009	3 × 20−22 Gy	88%	43%
Ricardi et al.	2010	3 × 15 Gy	88%	51%
Bral et al.	2010	60 Gy in 3−4 fractions	84%	52%
Timmerman et al.	2010	3 × 18 Gy	98%	38%

404 INVITED

Role of Radio-Frequency Ablation

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Today RFA is used primary lung neoplasms are close to those for surgical resection, in a curative intent in non-surgical or boarderline surgical candidates with T1A or T1B tumours. Inoperability is due to poor either respiratory function in relation do COBP in primary tumours, and iterative surgery or general comorbidities. Pre-ablation imaging work-up must be equivalent to a pre-surgical one, namely with PET-CT. Because, size is strong redictive factor of success, the largest diameter f the tumour should be ideally smaller than 3 cm, and in any manner larger than 5 cm. A review of 17 of the most recent publication demonstrated a median reported rate of complete ablation of 90%, even if high variability exists between publications with a range from 38% to 97% [1]. Most studies report a statistically significant lower success rate of ablation with tumours larger than 2 to 3 cm in diameter [2−5]. Oversizing ablation relative to the tumour improve complete ablation rate up to 96% at 18 months ablation when the ratio between the area of post-RFA ground glass opacity and the tumour area before treatment was at least 4 [2]. Ground glass opacity margins have been reported absent in 85% of post RFA CT of incompletely ablated tumours [6] Contact with a large vessel (>3 mm) has been reported by Hiraki et al and Gillams et al as a negative predictive factor of complete tumour ablation in lung [3,7].

A series of 75 primary NSCLC (75% stage IA and 25% stage IB) patients demonstrated a median survival of 29 months (IC95%: 20−30 months) with a 1, 2, 3, 4, and 5 years overall survival of 78%, 57%, 36%, 27%, and 27% [8]. Median survival for stage IA was 30 months and 25 months for stage IB. Better survival was reported for tumours 3 cm or smaller with a survival rate close to 50% at 5 years [8]. Grieco, et al., combined radiation therapy and RFA in 41 patients with NSCLC (Stage IA: 21; Stage IB: 17, Stage IIB: 3). The 27 patients with the largest tumours received external beam radiation (66 Gy) and the 14 patients with tumours less than 3 cm received brachytherapy through the puncture tract used for RFA. Combination treatment seems to improve results in NSCLC with 57% survival at 3 years. The median survival was 34.6$\pm$7 months for tumours larger than 3 cm and 44.4$\pm$5.4 months for tumours 3 cm or smaller ($p = 0.08$) [9]. Difference between overall survival [70% (95% CI 51−83%) at 1 year and 48% (30−65%)] at 2 years and Cancer-specific survival [92% (78−98%) at 1 year and 73% (54−86%) at 2 years] in patients with NSCLC highlight the comorbidities in the NSCLC patients treated with RFA [10].

The possibility to ablate larger volume gives hope for better rate of complete ablation for larger tumour even if datas about outcomes of MWA of pulmonary malignancies remain relatively scarce. Early reports are promising with the largest available clinical study includes 50 patients, including 30 with a non small cell lung cancer (NSCLC) treated with MWA during 66 ablation sessions for tumours 5 cm or smaller with a mean size of 3.5 cm$\pm$1.6 [11]. Tumour smaller than 2 cm were treated with a single antenna (53%), two antennae were used in 5%, 3 antennae in 27%, four antennae in 9%, and multi-probe loop antenna in 6%. 26% of patients had recurrent disease at the ablation site. This recurrent disease was most commonly found inn tumour large than 3 cm ($p = 0.01$). It is noteworthy that after MWA, on follow-up imaging cavitary changes were found in 43% of ablation and 6% results in documented infectious complications including one abscess and one pneumonia [11].

References

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