Radiotherapy
Current Awareness Newsletter
August 2016
**Outreach**

Your Outreach Librarian can help facilitate evidence-based practise for all PICU staff, as well as assisting with academic study and research. We can help with literature searching, obtaining journal articles and books, and setting up individual current awareness alerts.

**Literature Searching**

We provide a literature searching service for any library member. For those embarking on their own research it is advisable to book some time with one of the librarians for a 1 to 1 session where we can guide you through the process of creating a well-focused literature research and introduce you to the health databases access via NHS Evidence.

**Critical Appraisal Training**

We also offer one-to-one or small group training in literature searching, accessing electronic journals, and critical appraisal/Statistics. These are essential courses that teach how to interpret clinical papers.

For more information, email: katie.barnard@uhbristol.nhs.uk

**Books**

Books can be searched for using SWIMS our online catalogue at [www.swims.nhs.uk](http://www.swims.nhs.uk). Books and journals that are not available on site or electronically may be requested from other locations. Please email requests to: library@uhbristol.nhs.uk
# Upcoming Lunchtime Drop-in Sessions

The **Library and Information Service** provides free specialist information skills training for all UHBristol staff and students. To book a place, email: library@uhbristol.nhs.uk

If you’re unable to attend we also provide **one-to-one** or **small group** sessions. Contact library@uhbristol.nhs.uk or katie.barnard@uhbristol.nhs.uk to arrange a session.

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# Tables of Contents from relevant journals

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If you require full articles please email: library@uhbristol.nhs.uk

New Nice Guidance
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3. A feasibility study evaluating the relationship between dose and focal liver reaction in stereotactic ablative radiotherapy for liver cancer based on intensity change of Gd-EOB-DTPA-enhanced magnetic resonance images.
4. Technical Note: Validation and implementation of a wireless transponder tracking system for gated stereotactic ablative radiotherapy of the liver.
8. Lung stereotactic ablative body radiotherapy: A large scale multi-institutional planning comparison for interpreting results of multi-institutional studies.
9. A randomised phase II trial of Stereotactic Ablative Fractionated radiotherapy versus Radiosurgery for Oligometastatic Neoplasia to the lung (TROG 13.01 SAFRON II).
12. Solutions that enable ablative radiotherapy for large liver tumors: Fractionated dose painting, simultaneous integrated protection, motion management, and computed tomography image guidance.
17. Stereotactic ablative body radiotherapy for primary kidney cancer: what have we learned from prospective trials and what does the future hold?
24. Clinical and molecular markers of long-term survival after oligometastasis-directed stereotactic body
Results

26 of 26 results on Medline - (Liver SABR OR Stereotactic Ablative Body Radiotherapy).ti,ab [DT 2016-2016] [Languages English]


Source: Clinical oncology (Royal College of Radiologists (Great Britain)); Sep 2016; vol. 28 (no. 9); p. e109

Publication Date: Sep 2016

Publication Type(s): Journal Article


ISSN: 1433-2981

Place of Publication: England

Accession Number: 27131756

Author(s): Chang, J H; Cheung, P; Erler, D; Sonier, M; Korol, R; Chu, W

Subject Terms: Index Medicus

Abstract: To report the outcomes of a cohort of patients with renal cell carcinoma (RCC) treated using stereotactic ablative body radiotherapy (SABR). Patients treated with SABR for primary RCC from 1 January 2012 to 1 April 2015 were retrospectively reviewed. Patients were non-surgical candidates treated with doses ranging from 30 to 40 Gy in five fractions. The tumour sizes and serum creatinine were compared between the pre-treatment assessment and subsequent follow-up assessments. The worst acute and late grade ≥2 toxicity rates were recorded. In total, 16 patients were included in this study. The median follow-up was 19 months (range 7-30). Eleven patients had stable disease, four had partial responses and none had progressive disease, indicating a local control rate of 100%. One patient had grade 2 acute nausea and two patients had grade 4 renal toxicities (two patients with pre-existing stage 4-5 chronic kidney disease required dialysis following SABR). Four of four patients with pre-SABR symptoms (pain and/or haematuria) had symptomatic relief after SABR. SABR for RCC is safe, the toxicities are minimal, and the local control is excellent at early follow-up. This technique should be further evaluated in prospective clinical trials. Copyright © 2016 The Royal College of Radiologists. Published by Elsevier Ltd. All rights reserved.

Database: Medline

2. Multicentre treatment planning inter-comparison in a national context: The liver stereotactic ablative radiotherapy case.

Source: Physica medica : PM : an international journal devoted to the applications of physics to medicine and biology : official journal of the Italian Association of Biomedical Physics (AIFB); Jan 2016; vol. 32 (no. 1); p. 277-283

Publication Date: Jan 2016

Publication Type(s): Journal Article

DOI: http://doi.org/10.1016/j.ejmp.2015.09.009

ISSN: 1724-191X

Place of Publication: Italy

Accession Number: 26498378

Author(s): Esposito, Marco; Maggi, Giulia; Marino, Carmelo; Bottalico, Laura; Cagni, Elisabetta; Carbonini, Claudia; Casale, Micheline; Clemente, Stefania; D'Alesio, Valentina; Fedele, David; Giglioli, Francesca Romana; Landoni, Valeria; Martinotti, Anna; Nigro, Roberta; Strigari, Lidia; Villaggi, Elena; Mancosu, Pietro

Subject Terms: Index Medicus

Abstract: To compare five liver metastasis stereotactic ablative radiotherapy (SABR) plans optimised in fourteen centres with 3D-Conformal-RT, IMRT, VMAT, CyberKnife and Tomotherapy and identify possible
dosimetric differences. Dose prescription was 75 Gy in 3 fractions, normalised at 67%-95% isodose. Excluding few cases, all institutions achieved the planning objectives. Differences up to 40% and 25% in mean dose to liver and PTV were found. No significant correlations between technological factors and DVH for target and OARs were observed; the optimisation strategies selected by the planners played a key role in the planning procedure. The human factor and the constraints imposed to the target volume have a greater dosimetric impact than treatment planning and radiation delivery technology in stereotactic treatment of liver metastases.

Significant differences found both in terms of dosimetric target coverage and OAR sparing should be taken into consideration before starting a multi-institutional SARB clinical trial. Copyright © 2015 Associazione Italiana di Fisica Medica. Published by Elsevier Ltd. All rights reserved.

Database: Medline

3. A feasibility study evaluating the relationship between dose and focal liver reaction in stereotactic ablative radiotherapy for liver cancer based on intensity change of Gd-EOB-DTPA-enhanced magnetic resonance images.

Source: Radiation oncology journal; Mar 2016; vol. 34 (no. 1); p. 64-75
Publication Date: Mar 2016
Publication Type(s): Journal Article
DOI: http://doi.org/10.3857/roj.2016.34.1.64
ISSN: 2234-1900
Place of Publication: Korea (South)
Accession Number: 27104169
Author(s): Jung, Sang Hoon; Yu, Jeong Il; Park, Hee Chul; Lim, Do Hoon; Han, Youngyih

Abstract: In order to evaluate the relationship between the dose to the liver parenchyma and focal liver reaction (FLR) after stereotactic ablative body radiotherapy (SABR), we suggest a novel method using a three-dimensional dose distribution and change in signal intensity of gadoxetate disodium-gadolinium ethoxybenzyl diethylenetriamine pentaacetic acid (Gd-EOB-DTPA)-enhanced magnetic resonance imaging (MRI) hepatobiliary phase images. In our method, change of the signal intensity between the pretreatment and follow-up hepatobiliary phase images of Gd-EOB-DTPA-enhanced MRI was calculated and then threshold dose (TD) for developing FLR was obtained from correlation of dose with the change of the signal intensity. For validation of the method, TDs for six patients, who had been treated for liver cancer with SABR with 45-60 Gy in 3 fractions, were calculated using the method, and we evaluated concordance between volume enclosed by isodose of TD by the method and volume identified as FLR by a physician. The dose to normal liver was correlated with change in signal intensity between pretreatment and follow-up MRI with a median R(2) of 0.935 (range, 0.748 to 0.985). The median TD by the method was 23.5 Gy (range, 18.3 to 39.4 G). The median value of concordance was 84.5% (range, 44.7% to 95.9%). Our method is capable of providing a quantitative evaluation of the relationship between dose and intensity changes on follow-up MRI, as well as determining individual TD for developing FLR. We expect our method to provide better information about the individual relationship between dose and FLR in radiotherapy for liver cancer.

Database: Medline

4. Technical Note: Validation and implementation of a wireless transponder tracking system for gated stereotactic ablative radiotherapy of the liver.

Source: Medical physics; Jun 2016; vol. 43 (no. 6); p. 2794
Publication Date: Jun 2016
Publication Type(s): Journal Article
DOI: http://doi.org/10.1118/1.4948669
ISSN: 0094-2405
Place of Publication: United States
Accession Number: 27277027
Author(s): James, Joshua; Cetnar, Ashley; Dunlap, Neal E; Huffaker, Corinna; Nguyen, Vi Nhan; Potts, Melissa; Wang, Brian

Subject Terms: Index Medicus
Abstract: Tracking soft-tissue targets has recently been cleared as a new application of Calypso, an electromagnetic wireless transponder tracking system, allowing for gated treatment of the liver based on the motion of the target volume itself. The purpose of this study is to describe the details of validating the Calypso system for wireless transponder tracking of the liver and to present the clinical workflow for using it to deliver gated stereotactic ablative radiotherapy (SABR). A commercial 3D diode array motion system was used to evaluate the dynamic tracking accuracy of Calypso when tracking continuous large amplitude motion. It was then used to perform end-to-end tests to evaluate the dosimetric accuracy of gated beam delivery for liver SABR. In addition, gating limits were investigated to determine how large the gating window can be while still maintaining dosimetric accuracy. The gating latency of the Calypso system was also measured using a customized motion phantom. The average absolute difference between the measured and expected positional offset was 0.3 mm. The 2%/2 mm gamma pass rates for the gated treatment delivery were greater than 97%. When increasing the gating limits beyond the known extent of planned motion, the gamma pass rates decreased as expected. The 2%/2 mm gamma pass rate for a 1, 2, and 3 mm increase in gating limits was measured to be 97.8%, 82.9%, and 61.4%, respectively. The average gating latency was measured to be 63.8 ms for beam-hold and 195.8 ms for beam-on. Four liver patients with 17 total fractions have been successfully treated at our institution. Wireless transponder tracking was validated as a dosimetrically accurate way to provide gated SABR of the liver. The dynamic tracking accuracy of the Calypso system met manufacturer’s specification, even for continuous large amplitude motion that can be encountered when tracking liver tumors close to the diaphragm. The measured beam-hold gating latency was appropriate for targets that will traverse the gating limit each respiratory cycle causing the beam to be interrupted constantly throughout treatment delivery.

Database: Medline

Source: Surgical oncology clinics of North America; Jul 2016; vol. 25 (no. 3); p. 553-566
Publication Date: Jul 2016
Publication Type(s): Journal Article; Review
DOI: http://doi.org/10.1016/j.soc.2016.02.008
ISSN: 1558-5042
Place of Publication: United States
Accession Number: 27261915
Author(s): Abbas, Ghulam; Danish, Adnan; Krasna, Mark J
Subject Terms: Index Medicus

Abstract: The treatment paradigm for early stage lung cancer and oligometastatic disease to the lung is rapidly changing. Ablative therapies, especially stereotactic body radiation therapy, are challenging the surgical gold standard and have the potential to be the standard for operable patients with early stage lung cancer who are high risk due to co-morbidities. The most commonly used ablative modalities include stereotactic body radiation therapy, microwave ablation, and radiofrequency ablation. Copyright © 2016 Elsevier Inc. All rights reserved.

Database: Medline

Source: Clinical oncology (Royal College of Radiologists (Great Britain)); Jan 2016; vol. 28 (no. 1); p. 13-20
Publication Date: Jan 2016
Publication Type(s): Journal Article
DOI: http://doi.org/10.1016/j.clon.2015.08.011
ISSN: 1433-2981
Place of Publication: England
Accession Number: 26385822
Author(s): De Rose, F; Cozzi, L; Navarria, P; Ascolese, A M; Clerici, E; Infante, M; Alloisio, M; Testori, A; Toschi, L; Finocchiaro, G; Santoro, A; Scorsetti, M
Subject Terms: Index Medicus
Abstract: The aim of this observational study was the evaluation of toxicity, local control and overall survival in non-small cell lung cancer (NSCLC) oligometastatic patients who had undergone stereotactic ablative body radiotherapy (SABR) for lung metastatic lesions. SABR was carried out in oligometastatic patients with controlled primary tumour (adequate pulmonary function). We adopted the following dose prescriptions according to the site and the maximum diameter of the lung lesions: 60 Gy in three fractions for peripheral lesions with diameter ≤ 2 cm, 48 Gy in four fractions for peripheral lesions between 2 and 5 cm and 60 Gy in eight fractions for central lesions. A radiological response was defined according to RECIST criteria. Toxicity was recorded according to the Common Toxicity Criteria version 4.0. Between October 2010 and December 2014, 60 NSCLC patients with 90 lung lesions in total were treated at our institution. A radiological response was obtained in most patients. No pulmonary toxicity grade 4, chest pain or rib fracture occurred. The median follow-up from diagnosis was 28 months (range 5.4-104.5 months). The local control at 2 years was 88.9%. Overall survival at 1 and 2 years was 94.5 and 74.6%, respectively. SABR is well tolerated with a good radiological response and toxicity profile. Discussion within a multidisciplinary team is crucial to identify the oligometastatic patients who would probably benefit from ablative local therapy. Copyright © 2015 The Royal College of Radiologists. Published by Elsevier Ltd. All rights reserved.

Database: Medline


Source: Radiation oncology (London, England); 2016; vol. 11 ; p. 22
Publication Date: 2016
Publication Type(s): Research Support, Non-u.s. Gov't; Journal Article
ISSN: 1748-717X
Place of Publication: England
Accession Number: 26896371
Author(s): Paik, Eun Kyung; Kim, Mi-Sook; Jang, Won Il; Seo, Young Seok; Cho, Chul-Koo; Yoo, Hyung Jun; Han, Chul Ju; Park, Su Cheol; Kim, Sang Bum; Kim, Young Han
Available in full text at Radiation Oncology - from National Library of Medicine
Available in full text at Radiation Oncology - from BioMed Central
Available in full text at Radiation Oncology - from ProQuest
Subject Terms: Index Medicus

Abstract: This study aimed to evaluate the effect of stereotactic ablative radiotherapy (SABR) after incomplete transcatheter arterial chemoembolization (TACE) in hepatocellular carcinoma (HCC) patients. The study enrolled 178 HCC patients initially treated with TACE between 2006 and 2011. Patients were included if they had Barcelona Clinic Liver Cancer stage 0 or A, ≤3 nodules with a total sum of longest diameter ≤10 cm, Child-Turcotte-Pugh score of ≤7, no major vessel invasion, and no extra-hepatic metastases. Twenty-four patients achieved a complete response to TACE (group 1). Among those with incomplete response, 47 patients received other curative treatments (group 2), 37 received SABR (group 3), and 70 received non-curative treatments (group 4). The 2-year overall survival (OS) rates for groups 1, 2, 3, and 4 were 88 %, 81 %, 73 %, and 54 %, respectively. The corresponding 5-year OS rates were 50 %, 58 %, 53 %, and 28 %, respectively. Patients treated with SABR after incomplete TACE had similar survival outcomes to those achieving complete response to TACE or receiving curative treatments. However, patients receiving non-curative treatments had significantly lower survival rates than the other groups. Therefore, if SABR was indicated at the initial diagnosis, it might be recommended after TACE failure.

Database: Medline

8. Lung stereotactic ablative body radiotherapy: A large scale multi-institutional planning comparison for interpreting results of multi-institutional studies.

Source: Physica medica : PM : an international journal devoted to the applications of physics to medicine and biology : official journal of the Italian Association of Biomedical Physics (AIFB); Apr 2016; vol. 32 (no. 4); p. 600-606
Publication Date: Apr 2016
A large-scale multi-institutional planning comparison on lung cancer SABR is presented with the aim of investigating possible criticism in carrying out retrospective multicentre data analysis from a dosimetric perspective. Five CT series were sent to the participants. The dose prescription to PTV was 54Gy in 3 fractions of 18Gy. The plans were compared in terms of PTV-gEUD2 (generalized Equivalent Uniform Dose equivalent to 2Gy), mean dose to PTV, Homogeneity Index (PTV-HI), Conformity Index (PTV-CI) and Gradient Index (PTV-GI). We calculated the maximum dose for each OAR (organ at risk) considered as well as the MLD2 (mean lung dose equivalent to 2Gy). The data were stratified according to expertise and technology. Twenty-six centers equipped with Linacs, 3DCRT (4% - 1 center), static IMRT (8% - 2 centers), VMAT (76% - 20 centers), CyberKnife (4% - 1 center), and Tomotherapy (8% - 2 centers) collaborated. Significant PTV-gEUD2 differences were observed (range: 105-161Gy); mean PTV dose, PTV-HI, PTV-CI, and PTV-GI were, respectively, 56.8±3.4Gy, 14.2±10.1%, 0.70±0.15, and 4.9±1.9. Significant correlations for PTV-gEUD2 versus PTV-HI, and MLD2 versus PTV-GI, were observed. The differences in terms of PTV-gEUD2 may suggest the inclusion of PTV-gEUD2 calculation for retrospective data inter-comparison. Copyright © 2016 Associazione Italiana di Fisica Medica. Published by Elsevier Ltd. All rights reserved.

9. A randomised phase II trial of Stereotactic Ablative Fractionated radiotherapy versus Radiosurgery for Oligometastatic Neoplasia to the lung (TROG 13.01 SAFRON II).

Source: BMC cancer; 2016; vol. 16 ; p. 183

Publication Date: 2016

Publication Type(s): Research Support, Non-u.s. Gov't; Journal Article


ISSN: 1471-2407

Place of Publication: England

Accession Number: 26944262

Author(s): Siva, Shankar; Kron, Tomas; Bressel, Mathias; Haas, Marion; Mai, Tao; Vinod, Shalini; Sasso, Giuseppe; Wong, Wenchang; Le, Hien; Eade, Thomas; Hardcastle, Nicholas; Chesson, Brent; Pham, Daniel; Hayer, Morten; Montgomery, Rebecca; Ball, David

Available in full text at BMC Cancer - from ProQuest
Available in full text at BMC Cancer - from National Library of Medicine
Available in full text at BMC Cancer - from BioMed Central

Subject Terms: Index Medicus

Abstract: Stereotactic ablative body radiotherapy (SABR) is emerging as a non-invasive method for precision irradiation of lung tumours. However, the ideal dose/fractionation schedule is not yet known. The primary purpose of this study is to assess safety and efficacy profile of single and multi-fraction SABR in the context of pulmonary oligometastases. The TROG 13.01/ALTG 13.001 clinical trial is a multicentre unblinded randomised phase II study. Eligible patients have up to three metastases to the lung from any non-haematological malignancy, each < 5 cm in size, non-central targets, and have all primary and extrathoracic disease controlled with local therapies. Patients are randomised 1:1 to a single fraction of 28Gy versus 48Gy in four fractions of SABR. The primary objective is to assess the safety of each treatment arm, with secondary objectives including
assessment of quality of life, local efficacy, resource use and costs, overall and disease free survival and time to distant failure. Outcomes will be stratified by number of metastases and origin of the primary disease (colorectal versus non-colorectal primary). Planned substudies include an assessment of the impact of online e-Learning platforms for lung SABR and assessment of the effect of SABR fractionation on the immune responses. A total of 84 patients are required to complete the study. Fractionation schedules have not yet been investigated in a randomised fashion in the setting of oligometastatic disease. Assuming the likelihood of similar clinical efficacy in both arms, the present study design allows for exploration of the hypothesis that cost implications of managing potentially increased toxicities from single fraction SABR will be outweighed by costs associated with delivering multiple-fraction SABR. ACTRN12613001157763 , registered 17th October 2013.

Database: Medline


Source: Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology; Mar 2016; vol. 118 (no. 3); p. 540-546

Publication Date: Mar 2016

Publication Type(s): Research Support, Non-u.s. Gov't; Journal Article

DOI: http://doi.org/10.1016/j.radonc.2016.01.027

ISSN: 1879-0887

Place of Publication: Ireland

Accession Number: 26873790

Author(s): Siva, Shankar; Jackson, Price; Kron, Tomas; Bressel, Mathias; Lau, Eddie; Hofman, Michael; Shaw, Mark; Chander, Sarat; Pham, Daniel; Lawrentschuk, Nathan; Wong, Lih-Ming; Goad, Jeremy; Foroudi, Farshad

Subject Terms: Index Medicus

Abstract: To evaluate renal dysfunction after stereotactic ablative body radiotherapy (SABR) for inoperable primary renal cell carcinoma (RCC) using nuclear medicine assessments. In a prospective clinical trial, patients received single fraction renal SABR (26 Gy) for tumours <5 cm, or fractionated SABR (3 × 14 Gy) for tumours ≥5 cm. Global and regional glomerular filtration rate (GFR) was calculated through (51)Cr-EDTA and (99m)Tc-DMSA SPECT/CT, respectively, at baseline and post-treatment (14, 90 days and at 1-year). Regional loss in function was correlated to the absolute and biologically effective doses (BED) delivered. In 21 patients the mean (range) tumour size was 48 mm (21-75 mm). The mean ± SD GFR at baseline was 52 ± 24 ml/min. Net change in mean GFR was +0.6 ± 11.3, +3.2 ± 14.5 and -8.7 ± 13.4 ml/min (p=0.03) at 2 weeks, 3 months and 1 year, respectively. For every 10 Gy of physical dose delivered, an exponential decline in affected kidney GFR was observed at 39% for 26 Gy/1 fraction and 25% for 42 Gy/3 fractions. When normalised to BED3Gy, the dose-response relationship for each treatment prescription was similar with a plateau beyond 100 Gy. The R50% conformity index correlated with GFR loss (p=0.04). No patient required dialysis. SABR results in clinically acceptable and dose-dependent renal dysfunction at 1-year. Sparing functional kidney from high-dose regions (>50% isodoses) may help reduce risk of functional loss. Copyright © 2016 Elsevier Ireland Ltd. All rights reserved.

Database: Medline


Source: Annals of surgical oncology; Jan 2016; vol. 23 (no. 1); p. 218-224

Publication Date: Jan 2016

Publication Type(s): Research Support, Non-u.s. Gov't; Journal Article

DOI: http://doi.org/10.1245/s10434-015-4579-z

ISSN: 1534-4681

Place of Publication: United States

Accession Number: 25963478

Author(s): Meyer, Jeffrey J; Foster, Ryan D; Lev-Cohain, Naama; Yokoo, Takeshi; Dong, Ying; Schwarz, Roderich E; Rule, William; Tian, Jing; Xie, Yang; Hannan, Raquibul; Nedzi, Lucien; Solberg, Timothy;
There is significant interest in the use of stereotactic ablative radiotherapy (SABR) as a treatment modality for liver metastases. A variety of SABR fractionation schemes are in clinical use. We conducted a phase I dose-escalation study to determine the maximum tolerated dose of single-fraction liver SABR. Patients with liver metastases from solid tumors, for whom a critical volume dose constraint could be met, were treated with single-fraction SABR. Seven patients were enrolled to the first group, with a prescription dose of 35 Gy. Dose was then escalated to 40 Gy in a single fraction, and seven more patients were treated at this dose level. Patients were followed for toxicity and underwent serial imaging to assess lesion response and local control. Fourteen patients with 17 liver metastases were treated. There were no dose-limiting toxicities observed at either dose level. Nine of the 13 lesions assessable for treatment response showed a complete radiographic response to treatment; the remainder showed partial response. Local control of irradiated lesions was 100% at a median imaging follow-up of 2.5 years. Two-year overall survival for all patients was 78%. For selected patients with liver metastases, single-fraction SABR at doses of 35 and 40 Gy is tolerable and shows promising signs of efficacy at intermediate follow-up.

Database: Medline
The Korean Society of Radiation Oncologists (KOSRO) conducted the Patterns of Care Study (PCS) of radiotherapy (RT) for spine metastases in 2009. The current study was conducted to investigate current practice patterns and compare them with the results of the PCS. The survey questionnaire was composed of 10 questions regarding general information and seven questions for each of two clinical scenarios. Fifty-four members of the KOSRO answered at least one question on the web-based questionnaire. The yearly number of patients treated who underwent palliative spine RT was greater than 200 in 14 (25.9%), 51 to 100 in 13 (24.1%), and 31 to 50 in 11 respondents (20.4%). Scenario 1 described a patient presenting with cord compressive spine metastasis in multiple bones and liver metastasis from non-small cell lung cancer. Thirty gray (Gy) in 10 fractions was chosen by 35 respondents (64.8%). Scenario 2 described a case of a single spine metastasis without progression after targeted therapy. Thirty Gy in 10 fractions was chosen by 19 respondents (35.2%), and a single fraction or less than four fractions of stereotactic ablative radiotherapy (SABR) were selected by 18 respondents (33.3%). When compared with the 2009 PCS, practice patterns of Korean radiation oncologists had not changed significantly over 5 years, except that SABR emerged as a new treatment modality in the selected population. The 2014 PCS demonstrated that multiple fraction RT is still preferred in a considerable proportion of Korean radiation oncologists.

Modern Radiotherapy Concepts and the Impact of Radiation on Immune Activation.

Even though there is extensive research carried out in radiation oncology, most of the clinical studies focus on the effects of radiation on the local tumor tissue and deal with normal tissue side effects. The influence of dose fractionation and timing particularly with regard to immune activation is not satisfactorily investigated so far. This review, therefore, summarizes current knowledge on concepts of modern radiotherapy (RT) and evaluates the potential of RT for immune activation. Focus is set on radiation-induced forms of tumor cell death and consecutively the immunogenicity of the tumor cells. The so-called non-targeted, abscopal effects can contribute to anti-tumor responses in a specific and systemic manner and possess the ability to target relapsing tumor cells as well as metastases. The impact of distinct RT concepts on immune activation is outlined and pre-clinical evidence and clinical observations on RT-induced immunity will be discussed. Knowledge on the radiosensitivity of immune cells as well as clinical evidence for enhanced immunity after RT will be considered. While stereotactic ablative body radiotherapy seem to have a beneficial outcome over classical RT fractionation in pre-clinical animal models, in vitro model systems suggest an advantage for classical fractionated RT for immune activation. Furthermore, the optimal approach may differ based on the tumor site and/or genetic signature. These facts highlight that clinical trials are urgently needed to identify whether high-dose RT is superior to induce anti-tumor immune responses compared to classical fractionated RT and in particular how the outcome is when RT is combined with immunotherapy in selected tumor entities.


Clinical oncology (Royal College of Radiologists (Great Britain)); Sep 2016; vol. 28 (no. 9); p. e101
In technically advanced multicentre clinical trials, participating centres can benefit from a credentialing programme before participating in the trial. Education of staff in participating centres is an important aspect of a successful clinical trial. In the multicentre study of fractionated versus single fraction stereotactic ablative body radiotherapy in lung oligometastases (TROG 13.01), knowledge transfer of stereotactic ablative body radiotherapy techniques to the local multidisciplinary team is intended as part of the credentialing process. In this study, a web-based learning platform was developed to provide education and training for the multidisciplinary trial teams at geographically distinct sites. A web-based platform using eLearning software consisting of seven training modules was developed. These modules were based on extracranial stereotactic theory covering the following discrete modules: Clinical background; Planning technique and evaluation; Planning optimisation; Four-dimensional computed tomography simulation; Patient-specific quality assurance; Cone beam computed tomography and image guidance; Contouring organs at risk. Radiation oncologists, medical physicists and radiation therapists from hospitals in Australia and New Zealand were invited to participate in this study. Each discipline was enrolled into a subset of modules (core modules) and was evaluated before and after completing each module. The effectiveness of the eLearning training will be evaluated based on (i) knowledge retention after participation in the web-based training and (ii) confidence evaluation after participation in the training. Evaluation consisted of a knowledge test and confidence evaluation using a Likert scale. In total, 130 participants were enrolled into the eLearning programme: 81 radiation therapists (62.3%), 27 medical physicists (20.8%) and 22 radiation oncologists (16.9%). There was an average absolute improvement of 14% in test score (P < 0.001) after learning. This score improvement compared with initial testing was also observed in the long-term testing (>4 weeks) after completing the modules (P < 0.001). For most there was significant increase in confidence (P < 0.001) after completing all the modules. Copyright © 2016 The Royal College of Radiologists. Published by Elsevier Ltd. All rights reserved.


Radiation oncologists need reliable estimates of risk for various fractionation schemes for all critical anatomical structures throughout the body, in a clinically convenient format. Reliable estimation theory can become fairly complex, however, and estimates of risk continue to evolve as the literature matures. To navigate through this efficiently, a dose-volume histogram (DVH) Risk Map was created, which provides a comparison of radiation tolerance limits as a function of dose, fractionation, volume, and risk level. The graphical portion of the DVH Risk Map helps clinicians to easily visualize the trends, whereas the tabular portion provides quantitative precision for clinical implementation. The DVH Risk Map for rib tolerance from stereotactic ablative body radiotherapy (SABR) and stereotactic body radiation therapy (SBRT) is used as an example in this overview; the 5% and 50% risk levels for 1-5 fractions for 5 different volumes are given. Other articles throughout this issue of Seminars in Radiation Oncology present analysis of new clinical datasets including the
17. Stereotactic ablative body radiotherapy for primary kidney cancer: what have we learned from prospective trials and what does the future hold?

Source: Future oncology (London, England); Mar 2016; vol. 12 (no. 5); p. 601-606

Publication Date: Mar 2016

Publication Type(s): Journal Article

DOI: http://doi.org/10.2217/fon.16.6

ISSN: 1744-8301

Place of Publication: England

Accession Number: 26837548

Author(s): Siva, Shankar; Daniels, Christopher P; Ellis, Rodney J; Ponsky, Lee; Lo, Simon S

Subject Terms: Index Medicus

Database: Medline


Source: Cancer journal (Sudbury, Mass.); 2016; vol. 22 (no. 4); p. 274-279

Publication Date: 2016

Publication Type(s): Journal Article

DOI: http://doi.org/10.1097/PPO.000000000000204

ISSN: 1540-336X

Place of Publication: United States

Accession Number: 27441747

Author(s): Maquilan, Genevieve; Timmerman, Robert

Subject Terms: Index Medicus

Abstract: Stereotactic body radiation therapy (SBRT), also known as stereotactic ablative radiotherapy, is a technique of external beam radiation that delivers precisely targeted, ablative doses to extracranial sites. It has become an integral component of the management of early-stage non-small cell lung cancer (NSCLC). In this review, we discuss the technology and techniques used in treatment planning and delivery, the efficacy and toxicity of SBRT for medically inoperable early-stage NSCLC, and the preliminary investigations into the role of SBRT for operable early-stage NSCLC.

Database: Medline


Source: Cancer control : journal of the Moffitt Cancer Center; Jan 2016; vol. 23 (no. 1); p. 21-29

Publication Date: Jan 2016

Publication Type(s): Journal Article

ISSN: 1526-2359

Place of Publication: United States

Accession Number: 27009453

Author(s): Ahmed, Kamran A; Torres-Roca, Javier F

Subject Terms: Index Medicus

Abstract: The treatment of oligometastatic disease has become common as imaging techniques have advanced and the management of systemic disease has improved. Use of highly targeted, hypofractionated regimens of stereotactic body radiotherapy (SBRT) is now a primary management option for patients with oligometastatic disease. The properties of SBRT are summarized and the results of retrospective and prospective studies of...
SBRT use in the management of oligometastases are reviewed. Future directions of SBRT, including optimizing dose and fractionation schedules, are also discussed. SBRT can deliver highly conformal, dosed radiation treatments for ablative tumors in a few treatment sessions. Phase 1/2 trials and retrospective institutional results support use of SBRT as a treatment option for oligometastatic disease metastasized to the lung, liver, and spine, and SBRT offers adequate toxicity profiles with good rates of local control. Future directions will involve optimizing dose and fractionation schedules for select histologies to improve rates of local control while limiting toxicity to normal structures. SBRT offers an excellent management option for patients with oligometastases. However, additional research is still needed to optimize dose and fractionation schedules.

Database: Medline

Source: Cancer journal (Sudbury, Mass.); 2016; vol. 22 (no. 4); p. 280-289
Publication Date: 2016
Publication Type(s): Journal Article
DOI: http://doi.org/10.1097/PPO.0000000000000205
ISSN: 1540-336X
Place of Publication: United States
Accession Number: 27441748
Author(s): Jabbari, Siavash; Gerszten, Peter C; Ruschin, Mark; Larson, David A; Lo, Simon S; Sahgal, Arjun
Subject Terms: Index Medicus
Abstract: Spine metastases can be a debilitating and difficult therapeutic challenge for a significant number of cancer patients. Surgical management of spine metastases is often limited because of the complexity, risks, and recovery delays associated with open invasive surgical procedures. Conventional palliative external beam radiation therapy is the most common treatment modality. However, it is associated with limited palliative efficacy and local tumor control, including in the postoperative setting. In the era of improving systemic disease control, spine stereotactic body radiotherapy is fast emerging as the therapeutic modality of choice for selected de novo, postoperative, and salvage reirradiation spine metastases patients. Considerable expertise, multidisciplinary collaboration, and rigid adherence to quality metrics are required for the safe application of this highly conformal ablative therapy. This review highlights the current state of the evidence, understanding of the late effects, and technological requirements for spine stereotactic body radiotherapy specific to spinal metastases.

Database: Medline

Source: Cancer journal (Sudbury, Mass.); 2016; vol. 22 (no. 4); p. 247-256
Publication Date: 2016
Publication Type(s): Journal Article
DOI: http://doi.org/10.1097/PPO.0000000000000202
ISSN: 1540-336X
Place of Publication: United States
Accession Number: 27441744
Author(s): Correa, Rohann J M; Salama, Joseph K; Milano, Michael T; Palma, David A
Subject Terms: Index Medicus
Abstract: Oligometastasis refers to a state of limited metastatic disease burden, in which surgical or ablative treatment to all known visible metastases holds promise to extend survival or even effect cure. Stereotactic body radiotherapy is a form of radiation treatment capable of delivering a high biologically effective dose of radiation in a highly conformal manner, with a favorable toxicity profile. Enthusiasm for oligometastasis ablation, however, should be counterbalanced against the limited supporting evidence. It remains unknown to what extent (if any) ablation influences survival or quality of life. Rising clinical equipoise necessitates the completion of randomized controlled trials to assess this, several of which are underway. However, a lack of clear identification criteria or biomarkers to define the oligometastatic state hampers optimal patient selection. This
narrative review explores the evolutionary origins of oligometastasis, the steps of the metastatic process at which oligometastases may arise, and the biomolecular mediators of this state. It discusses clinical outcomes with treatment of oligometastases, ongoing trials, and areas of basic and translational research that may lead to novel biomarkers. These efforts should provide a clearer, biomolecular definition of oligometastatic disease and aid in the accurate selection of patients for ablative therapies.

Database: Medline


Source: The oncologist; Apr 2016; vol. 21 (no. 4); p. 393-398
Publication Date: Apr 2016
Publication Type(s): Editorial
DOI: http://doi.org/10.1634/theoncologist.2015-0477
ISSN: 1549-490X
Place of Publication: United States
Accession Number: 26984447
Author(s): Siva, Shankar; Ball, David
Subject Terms: Index Medicus
Database: Medline


Source: Radiation oncology (London, England); 2016; vol. 11; p. 9
Publication Date: 2016
Publication Type(s): Research Support, Non-u.s. Gov't; Journal Article
ISSN: 1748-717X
Place of Publication: England
Accession Number: 26796633
Author(s): Pasqualetti, Francesco; Panichi, Marco; Sainato, Aldo; Matteucci, Fabrizio; Galli, Luca; Cocuzza, Paola; Ferrarazza, Patrizia; Coraggio, Gabriele; Pasqualetti, Giuseppe; Derosa, Lisa; Sollini, Martina; Mannelli, Lorenzo; Ortori, Simona; Monzani, Fabio; Ricci, Sergio; Greco, Carlo; Fabrini, Maria Grazia; Erba, Paola Anna
Available in full text at Radiation Oncology - from National Library of Medicine
Available in full text at Radiation Oncology - from BioMed Central
Available in full text at Radiation Oncology - from ProQuest
Subject Terms: Index Medicus

Abstract: A new entity of patients with recurrent prostate cancer limited to a small number of active metastatic lesions is having growing interest: the oligometastatic patients. Patients with oligometastatic disease could eventually be managed by treating all the active lesions with local therapy, i.e. either surgery or ablative stereotactic body radiotherapy. This study aims to assess the impact of [(18)F]Choline ([(18)F]FMCH) PET/CT and the use stereotactic body radiotherapy (SBRT) in patients (pts) with oligometastatic prostate cancer (PCa). Twenty-nine pts with oligometastatic PCa (≤3 synchronous active lesions detected with [(18)F]FMCHPET/CT) were treated with repeated salvage SBRT until disease progression (development of > three active synchronous metastases). Primary endpoint was systemic therapy-free survival measured from the baseline [(18)F]FMCHPET/CT. A total of 45 lesions were treated with SBRT. After a median follow-up of 11.5 months (range 3-40 months), 20 pts were still in the study and did not receive any systemic therapy. Nine pts started systemic therapy, and the median time of the primary endpoint was 39.7 months (CI 12.20-62.14 months). No grade 3 or 4 toxicity was recorded. Repeated salvage [(18)F]FMCHPET/CT-guided SBRT is well tolerated and could defer the beginning of systemic therapy in selected patients with oligometastatic PCa.

Database: Medline
24. Clinical and molecular markers of long-term survival after oligometastasis-directed stereotactic body radiotherapy (SBRT).

Source: Cancer; Jul 2016; vol. 122 (no. 14); p. 2242-2250

Publication Date: Jul 2016

DOI: http://doi.org/10.1002/cncr.30058

Abstract: The selection of patients for oligometastasis-directed ablative therapy remains a challenge. The authors report on clinical and molecular predictors of survival from a stereotactic body radiotherapy (SBRT) dose-escalation trial for oligometastases. Patients who had from 1 to 5 metastases, a life expectancy of >3 months, and a Karnofsky performance status of >60 received escalating SBRT doses to all known cancer sites. Time to progression, progression-free survival, and overall survival (OS) were calculated at the completion of SBRT, and clinical predictors of OS were modeled. Primary tumor microRNA expression was analyzed to identify molecular predictors of OS. Sixty-one evaluable patients were enrolled from 2004 to 2009. The median follow-up was 2.3 years for all patients (range, 0.2-9.3 years) and 6.8 years for survivors (range, 2.0-9.3 years). The median, 2-year, and 5-year estimated OS were 2.4 years, 57%, and 32%, respectively. The rate of progression after SBRT was associated with an increased risk of death (hazard ratio [HR], 1.44; 95% confidence interval [CI], 1.24-1.82). The time from initial cancer diagnosis to metastasis (HR, 0.98; 95% CI, 0.98-0.99), the time from metastasis to SBRT (HR, 0.98; 95% CI, 0.98-0.99), and breast cancer histology (HR, 0.12; 95% CI, 0.07-0.37) were significant predictors of OS. In an exploratory analysis, a candidate classifier using expression levels of 3 microRNAs (miR-23b, miR-449a, and miR-449b) predicted survival among 17 patients who had primary tumor microRNA expression data available. A subset of oligometastatic patients achieves long-term survival after metastasis-directed SBRT. Clinical features and primary tumor microRNA expression profiling, if validated in an independent dataset, may help select oligometastatic patients most likely to benefit from metastasis-directed therapy. Cancer 2016;122:2242-50. © 2016 American Cancer Society. © 2016 American Cancer Society.

Database: Medline


Source: Clinics (São Paulo, Brazil); Feb 2016; vol. 71 (no. 2); p. 101-109

Publication Date: Feb 2016

DOI: http://doi.org/10.6061/clinics/2016(02)09

Abstract: Many cancer patients will develop spinal metastases. Local control is important for preventing neurologic compromise and to relieve pain. Stereotactic body radiotherapy or spinal radiosurgery is a new radiation therapy technique for spinal metastasis that can deliver a high dose of radiation to a tumor while minimizing the radiation delivered to healthy, neighboring tissues. This treatment is based on intensity-
modulated radiotherapy, image guidance and rigid immobilization. Spinal radiosurgery is an increasingly utilized treatment method that improves local control and pain relief after delivering ablative doses of radiation. Here, we present a review highlighting the use of spinal radiosurgery for the treatment of metastatic tumors of the spine. The data used in the review were collected from both published studies and ongoing trials. We found that spinal radiosurgery is safe and provides excellent tumor control (up to 94% local control) and pain relief (up to 96%), independent of histology. Extensive data regarding clinical outcomes are available; however, this information has primarily been generated from retrospective and nonrandomized prospective series. Currently, two randomized trials are enrolling patients to study clinical applications of fractionation schedules spinal Radiosurgery. Additionally, a phase I clinical trial is being conducted to assess the safety of concurrent stereotactic body radiotherapy and ipilimumab for spinal metastases. Clinical trials to refine clinical indications and dose fractionation are ongoing. The concomitant use of targeted agents may produce better outcomes in the future.

Database: Medline

Source: Physics in medicine and biology; Jul 2016; vol. 61 (no. 14); p. R167
Publication Date: Jul 2016
Publication Type(s): Journal Article
DOI: http://doi.org/10.1088/0031-9155/61/14/R167
ISSN: 1361-6560
Place of Publication: England
Accession Number: 27351409
Author(s): Kron, Tomas; Lehmann, Joerg; Greer, Peter B
Available in full text at Physics in Medicine and Biology - from Institute of Physics ; Collection notes: Only available on NHS networked computers. Not available with Athens username/password.
Subject Terms: Index Medicus
Abstract: Dosimetry of ionising radiation is a well-established and mature branch of physical sciences with many applications in medicine and biology. In particular radiotherapy relies on dosimetry for optimisation of cancer treatment and avoidance of severe toxicity for patients. Several novel developments in radiotherapy have introduced new challenges for dosimetry with small and dynamically changing radiation fields being central to many of these applications such as stereotactic ablative body radiotherapy and intensity modulated radiation therapy. There is also an increasing awareness of low doses given to structures not in the target region and the associated risk of secondary cancer induction. Here accurate dosimetry is important not only for treatment optimisation but also for the generation of data that can inform radiation protection approaches in the future. The article introduces some of the challenges and highlights the interdependence of dosimetric calculations and measurements. Dosimetric concepts are explored in the context of six application fields: reference dosimetry, small fields, low dose out of field, in vivo dosimetry, brachytherapy and auditing of radiotherapy practice. Recent developments of dosimeters that can be used for these purposes are discussed using spatial resolution and number of dimensions for measurement as sorting criteria. While dosimetry is ever evolving to address the needs of advancing applications of radiation in medicine two fundamental issues remain: the accuracy of the measurement from a scientific perspective and the importance to link the measurement to a clinically relevant question. This review aims to provide an update on both of these.
Database: Medline

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