RESEARCH TOPIC CLI22

Advanced Radiation Therapy for Hepatocellular Carcinoma: From Stereotactic Body Radiation Therapy to Proton Beam for Personalized Treatment Strategies

Research Area
Services Area

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Abstract
Hepatocellular carcinoma (HCC) represents the most common primary liver cancer, constituting a significant global health burden. The complexity and heterogeneity of HCC necessitate a multidisciplinary approach. In recent years, modern radiation therapy (RT) techniques, such as Stereotactic Body Radiation Therapy (SBRT), have been recognized for its efficacy in treating HCC. SBRT, as an advanced ablative treatment modality, promises substantial benefits but still necessitates further research for optimal integration into the main HCC treatment strategy guidelines. Additionally, the potential of Proton Beam Therapy (PBT) is increasingly acknowledged, driven by its unique physical properties that align well with the requirements for liver irradiation.

This research aims to delineate the role of SBRT and PBT, within the context of a multidisciplinary approach to HCC treatment. It seeks to evaluate, through clinical and translational analysis, its effectiveness and safety, identify optimal utilization strategies, and explore the integration of these therapies into personalized treatment approaches, thereby contributing to improved patient outcomes.

Scientific references

Bray F, Ferlay J, Soerjomataram I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin (2018) 68(6):394–424. doi: 10.3322/caac.21492

Jang WI, Kim MS, Bae SH, et al. High-dose stereotactic body radiotherapy correlates increased local control and overall survival in patients with inoperable hepatocellular carcinoma. Radiat Oncol (2013) 8:250. doi: 10.1186/1748-717X-8-250

Hong TS, Wo JY, Yeap BY, et al. Multi-institutional phase II study of high-dose hypofractionated proton beam therapy in patients with localized, unresectable hepatocellular carcinoma and intrahepatic cholangiocarcinoma. J Clin Oncol (2016) 34(5):460–8. doi: 10.1200/JCO.2015.64.2710

Lievens Y, Ricardi U, Poortmans P, et al. Radiation oncology. optimal health for all, together. ESTRO vision, 2030. Radiother Oncol (2019) 136:86–97. doi: 10.1016/j.radonc.2019.03.031

Cabibbo G, Daniele B, Borzio M, et al. Multidisciplinary treatment of hepatocellular carcinoma in 2023: Italian practice Treatment Guidelines of the Italian Association for the Study of the Liver (AISF), Italian Association of Medical Oncology (AIOM), Italian Association of Hepato-Bilio-Pancreatic Surgery (AICEP), Italian Association of Hospital Gastroenterologists (AIGO), Italian Association of Radiology and Clinical Oncology (AIRO), Italian Society of Pathological Anatomy and Diagnostic Cytology (SIAPeC-IAP), Italian Society of Surgery (SIC), Italian Society of Gastroenterology (SIGE), Italian Society of Medical and Interventional Radiology (SIRM), Italian Organ Transplant Society (SITO), and Association of Patients with Hepatitis and Liver Disease (EpaC) - Part II - Non-surgical treatments. Dig Liver Dis. 2024 Mar;56(3):394-405. doi: 10.1016/j.dld.2023.10.028. Epub 2023 Dec 4. PMID: 38052656.

Bae SH, Chun SJ, Chung JH, et al. Stereotactic Body Radiation Therapy for Hepatocellular Carcinoma: Meta-Analysis and International Stereotactic Radiosurgery Society Practice Guidelines. Int J Radiat Oncol Biol Phys. 2024 Feb 1;118(2):337-351. doi: 10.1016/j.ijrobp.2023.08.015. Epub 2023 Aug 18. PMID: 37597757.

Cozzi L, Comito T, Loi M, et al. The Potential Role of Intensity-Modulated Proton Therapy in Hepatic Carcinoma in Mitigating the Risk of Dose De-Escalation. Technol Cancer Res Treat. 2020 Jan-Dec;19:1533033820980412. doi: 10.1177/1533033820980412. PMID: 33287650; PMCID: PMC7727039.

Scorsetti M, Comito T, Cozzi L, et al. The challenge of inoperable hepatocellular carcinoma (HCC): results of a single-institutional experience on stereotactic body radiation therapy (SBRT). J Cancer Res Clin Oncol. 2015 Jul;141(7):1301-9. doi: 10.1007/s00432-015-1929-y. Epub 2015 Feb 3. PMID: 25644863.

Kobeissi JM, Hilal L, Simone CB 2nd, et al. Proton Therapy in the Management of Hepatocellular Carcinoma. Cancers (Basel). 2022 Jun 12;14(12):2900. doi: 10.3390/cancers14122900. PMID: 35740567; PMCID: PMC9220794.

Mizumoto M, Ogino H, Okumura T, et al. Proton Beam Therapy for Hepatocellular Carcinoma: Multicenter Prospective Registry Study in Japan. Int J Radiat Oncol Biol Phys. 2024 Mar 1;118(3):725-733. doi: 10.1016/j.ijrobp.2023.09.047. Epub 2023 Sep 30. PMID: 37778422.

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Type of contract

Contract for continuative and coordinated service of at least € 26.000 activated Istituto Clinico Humanitas. This sum is subject to IRPEF income tax.

Contratto collaborazione coordinata e continuativa (cococo) pari ad almeno € 26.000 annui lordi attivato da Istituto Clinico Humanitas. Importo soggetto a tassazione IRPEF.

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