

CASE REPORT OF COMPLETE RESPONSE IN SINGLE BRAIN METASTASES BY LUNG CANCER TREATED WITH STEREOTACTIC RADIOTHERAPY-LINAC BASED.

F. Gregucci *, I. Bonaparte *, A. Surgo *, M. Caliandro *, R. Carbonara *, MP. Ciliberti *, A. Fiorentino *.

* *Department of Radiation Oncology, Miulli General Regional Hospital, Acquaviva delle Fonti-Bari, Italy*

BACKGROUND

Radiation therapy (RT) plays a key role in the treatment of several Central Nervous System oncological and non-oncological diseases, with growing attention for stereotactic radiotherapy (SRT). Non-invasiveness, precision, safety, and efficacy are the elements that over the years have allowed RT to achieve therapeutic goals. With the continuous improvement of techniques and technologies available today, the purpose of modern RT is to reduce the exposure of healthy tissues to radiations and to improve the accuracy in the delivery of therapeutic dose to target lesion. In this direction, the immobilization systems are relevant to ensure the correct and reproducible positioning of the patient at the beginning and during RT and at the same time the possibility of monitoring the correct maintenance of this position during RT delivery.

Here, we report a case of patient underwent to SRT for brain metastases using Solstice™ SRS Immobilization System, CIVCO ® Radiotherapy (Kalona, USA) device.

CASE REPORT

Presenting concerns, clinical findings and diagnostic assessment

In March 2020, for persistent headache, a 62-years-old patient without comorbidities, PS ECOG 1, underwent to CT scan of the skull with evidence of suprasellar neof ormation in close proximity to the pituitary, chiasm and vascular structures subsequent diagnostic study with angio-CT and MRI of the brain with contrast. The angio-CT excluded the possibility of vascular malformation, while the MRI confirmed “*the presence of solid formation with iso-hypointense signal in the long TR sequences, with moderate contrast enhancement, at the suprasellar site, in close contiguity with the pituitary pendulum, which divides the optical tracts, with diameters of about 8 x 11 x 9 mm, probably referable to craniopharyngioma*”. However, CT total body scheduled to complete the staging process showed the presence of 3 cm left lung lesion associated with ipsilateral hilar adenopathy, several bilateral pulmonary micronodules and right adrenal lesion compatible with metastases. Subsequently, a biopsy of the intracranial lesion was performed with histological diagnosis of poorly differentiated lung adenocarcinoma.

Therapeutic intervention: multidisciplinary approach

His case was discussed at the multidisciplinary tumor board and the decision was: stereotactic radiation therapy (SRT) for brain lesion and first line of systemic therapy for stage IV lung cancer.

Treatment

In October 2020, patient underwent to SRT.

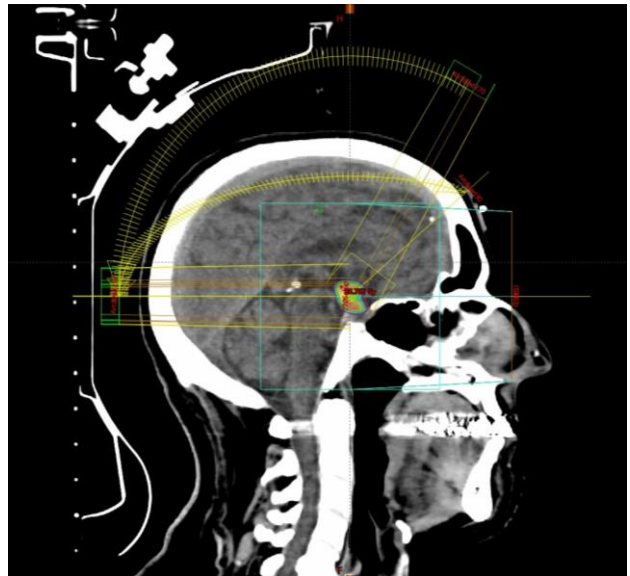
A 1-mm slice thickness CT simulation scan in supine position, with Solstice™ SRS Immobilization System, CIVCO® Radiotherapy (Kalona, USA) device was acquired. The target was defined as GTV coincided with CTV, according to international guidelines, based on T1 contrast sequence of MRI on rigid co-registration with CT simulation. Considering the proximity to chiasma, no margins were added from CTV to PTV. To respect the constraints of organs at risk, a total dose of 23 Gy in 5 daily fractions was prescribed according to ICRU91 guideline at 80% isodose with a maximum dose of 28,7 Gy. The treatment was delivered using VMAT technique with 4 non-coplanar arcs (couch angles 0,30,270,330 degree). The plan was created using 6-MV photon beams commissioned for a Varian TrueBeam Linac (Varian Medical System, Palo Alto, California, USA) (Figure 1). Daily IGRT with CBCT and SGRT with Align RT®, were used to set-up control and beam-on.

Figure 1. Treatment planning (A1 and A2) and relative Dose-Volume Histogram (B)

(A1)



(A2)



(B)



Red: PTV; Purple: chiasma; Blu: brainstem; Green: healthy brain minus PTV

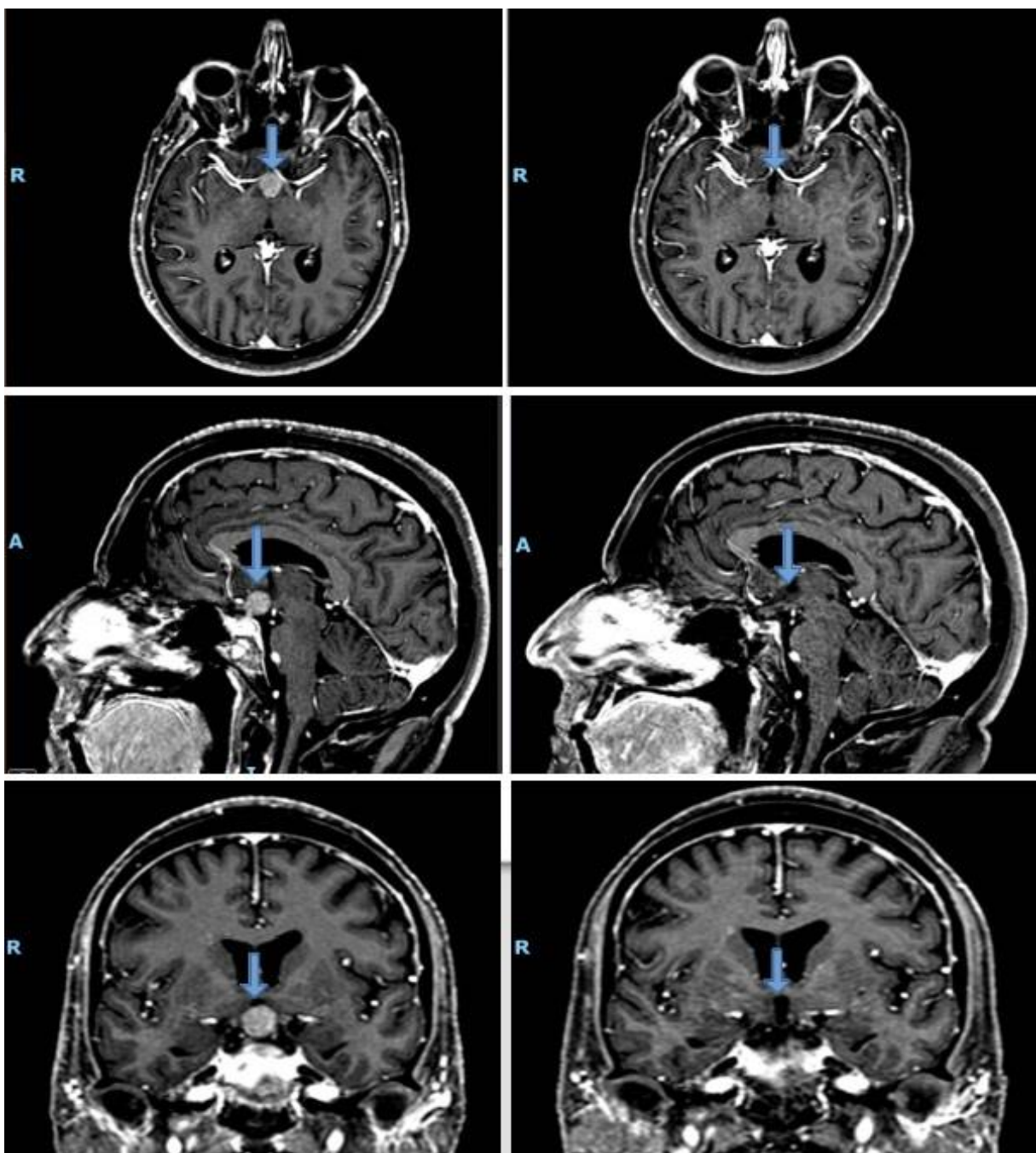
Treatment response and outcome

Patient completed the planned treatment without any interruption and without acute side effects. No RT late side effects were registered. The MRI of the brain with contrast performed in December 2020 (2 months after SRT) showed a complete response of treated intracranial lesion without appearance of new out-field lesions (Figure 2). the patient remained in excellent general condition and continued his therapeutic program.

Figure 2. MRI of the brain with contrast before (A) and 2-months after SRT (B)

(A)

(B)



CONCLUSION

In our clinical experience, Solstice™ SRS Immobilization System, CIVCO ® Radiotherapy (Kalona, USA) device allows to obtain an excellent stability and reproducibility for the positioning of the patient in the treatment of brain lesions, especially in the field of Linac-based Radiosurgery. This advantage translates into the possibility of reducing the “*safety margins*” between the clinical target volume (CTV) and the planning target volume (PTV) with sub-millimeter precision, obtaining savings in the irradiation of the healthy brain. Furthermore, patients report a high level of comfort, availing of a sure non-invasive open-face immobilization system which ensures highly quality, performing and effective radiation brain treatments.