



EXCELLENCE IN
CANCER CARE

NCCI Neurospinal & Cancer Care Institute M. HASHIM MEMORIAL TRUST



أفضل الأشغال خدمت الناس

PAKISTAN GAMMA KNIFE & X-KNIFE RADIATION ★ PET CT & PET-GUIDED RADIOTHERAPY ★ NEUROSPINAL & MEDICAL SERVICES

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Deep Brain Stimulation

Deep Brain Stimulation (DBS) is a surgical treatment which implants a medical device called a Brain Pacemaker.

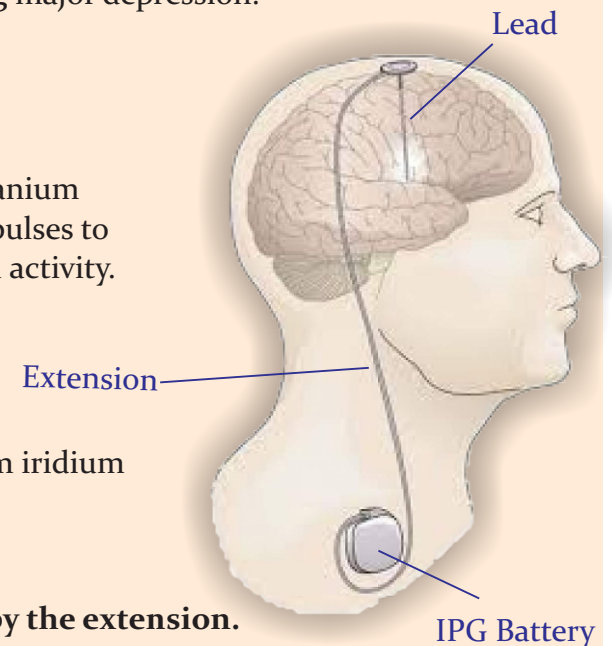
DBS sends electrical impulse to specific parts of the brain which need to be stimulated. DBS in selected brain regions has provided effective benefits for the diseases such as

- (i) Parkinson's Disease
- (ii) Dystonia
- (iii) Tremor
- (iv) Chronic pain

The Food and Drug Administration (FDA) approved DBS as a treatment for essential tremor and Parkinson's disease (PD) in 1997, Dystonia in 2003, obsessive compulsive disorder (OCD) in 2009 and epilepsy in 2018. DBS has been studied in clinical trials as a potential treatment for chronic pain for various affective disorders, including major depression.

DBS system consists of 3 parts

- (I) The IPG : is a battery-powered neurostimulator encased in a titanium housing, which sends electrical pulses to the brain to interfere with neural activity.
- (ii) LEAD the target site is a coiled.
- (iii) EXTENSION in polyurethane : wire insulated with four platinum iridium electrodes .



The lead is connected to the IPG by the extension.

Deep Brain Stimulation by NCCI is a brand of “Renewed Hope” being with better technology, innovative features and cost-effectiveness. It helps them live a normal life without becoming a liability on society.

Early diagnosis of Cancer with PET CT SCAN

Why Early Diagnosis of Head & Neck Cancers is Difficult?

Cancers in the head and neck region at early stages are commonly associated with few symptoms, and when symptoms are present, they may be minor and nonspecific. Even advanced-stage cancers at initial presentation may have few, minimal, or nonspecific symptoms.

How PET-CT SCAN Can Help

A 57 Years old male with complain of inability to swallow (Dysphagia).

Biopsy was done in July 2018 and it was in conclusive (No evidence of any malignancy).

Patient consulted (As Second Opinion) to Neurospinal & Cancer Care Institute (NCCI) where biopsy was planned again for proper diagnosis and PET / CT SCAN was planned to achieve a good biopsy.

GROSS DESCRIPTION:

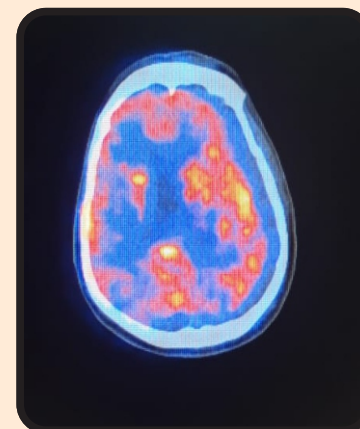
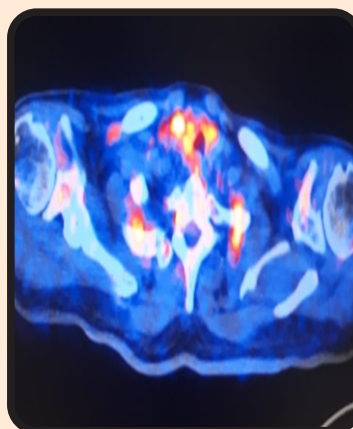
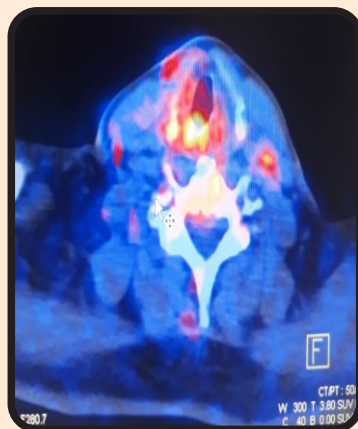
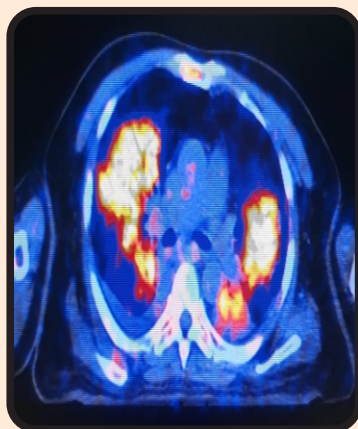
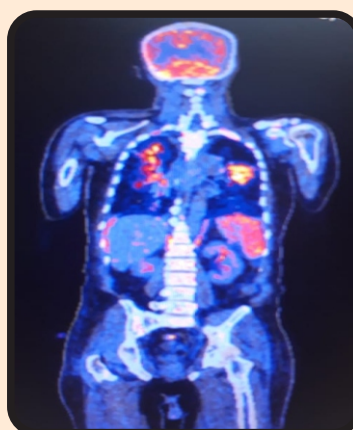
The specimen is received in formalin coded as "Right nasopharyngeal mass". It consists of four grey white irregular tissue pieces measuring 1.2 x 0.6 cm in agg. Entirely submitted in a single cassette (SUM).

MICROSCOPIC DESCRIPTION:

Section shows fragments covered by respiratory mucosa with underlying seromucinous glands and moderate lymphoplasmacytic infiltrate. In one fragment abundant lymphoplasmacytic cells are seen with polymorphonuclear neutrophils and histiocytes. PASD stain is negative for fungus. Cytokeratin AE1/AE3 highlights surface mucosa. CD20 and CD3 show mixed lymphoid population.

DIAGNOSIS: Right nasopharyngeal mass:
Respiratory mucosa with reactive lymphoid tissue.

Unfortunately PET / CT SCAN showed metastasis from Oropharynx to various other sites including lungs, Skull base, Spine, Iliac crest and Abdomen.



This is eye opening message for doctor's community that this patient would have been saved with earlier diagnosis of Cancer done by PET / CT SCAN and treated at time.

Neurospinal & Cancer Care Institute (NCCI) is the first and the only facility that installed (64 Sliced) PET / CT SCAN that can

- Detect cancer at an early stage.
- Determine whether a cancer has spread in the body.
- Assess the effectiveness of a treatment plan, such as cancer therapy.
- Determine if a cancer has returned after treatment.
- Evaluate brain abnormalities, such as tumors, memory disorders, seizures and other central nervous system disorders.

INTERNATIONAL STORY

A Distributed and Efficient Method to Treat Multiple Brain Metastases Using Leksell Gamma Knife® Icon™

- 38 year old male
- Patient presented with lung cancer and multiple metastases in the brain
- No significant headaches, nausea or vomiting
- Molecular status was ALK+ve, EGFR and PDL1-ve

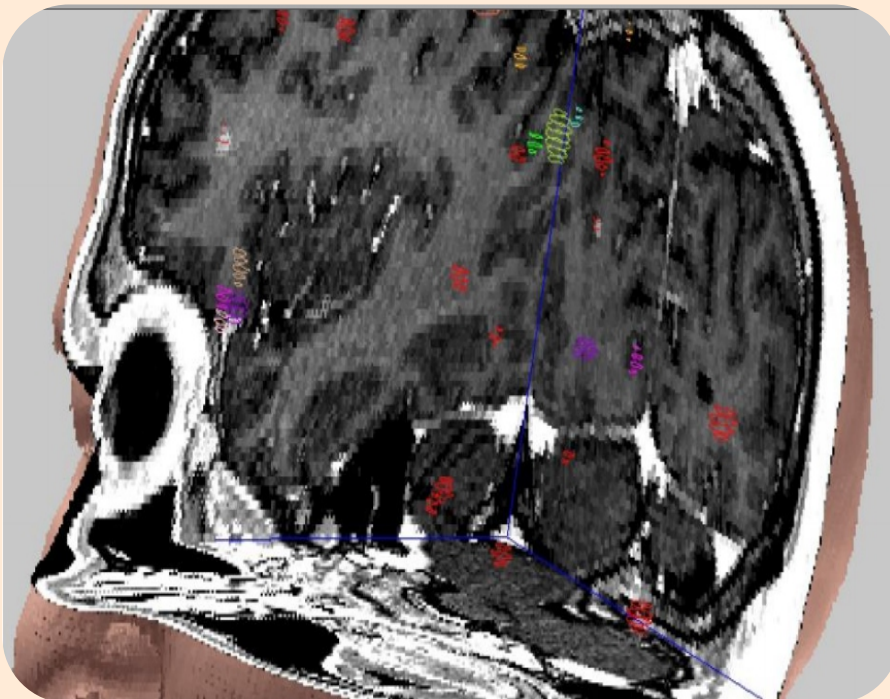
Case Overview

Number of metastasis: 34

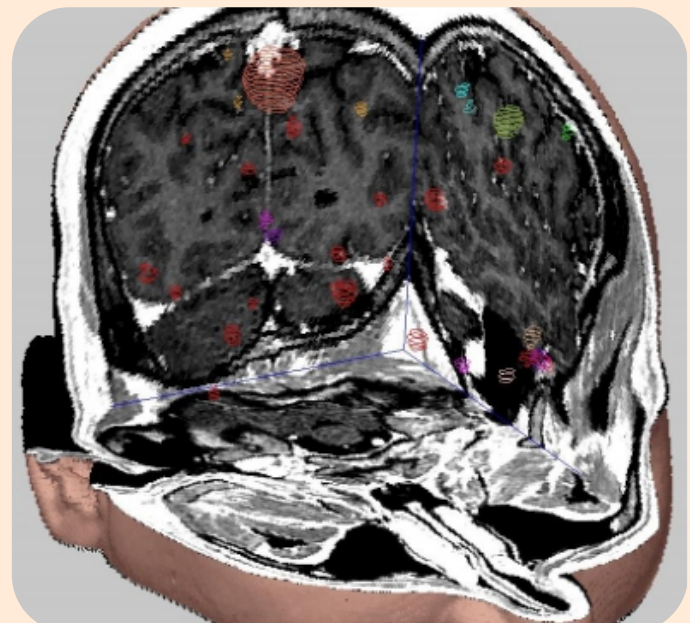
Median (range) GTV volume: 0.026 (0.004 – 2.517) cm³

(Note: The range of the targets is 0.004 - 0.265 cm³ if the largest target is excluded.)

Total GTV volume: 4.0 cm



Cut-volume views showing numerous contoured metastases in the brain. August, 2017



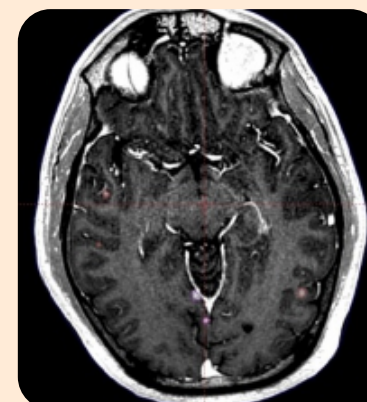
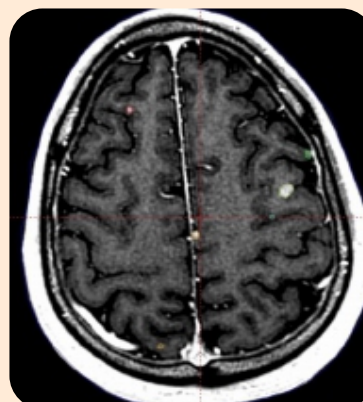
WHY

Leksell Gamma Knife Icon?

Given that the patient is young, ALK+ve and newly diagnosed, the team at Sunnybrook wanted to provide definitive local control to the existing lesions and reserve whole brain radiation as a salvage therapy. Especially as the new targeted agents for ALK+ve lung cancer can cross the blood-brain-barrier and potentially control micrometastatic disease.

As the majority of the tumors are subcentimeter, Leksell Gamma Knife was thought to be the ideal technology as the normal brain tissue will receive the lowest integral dose as compared to MLC based technology. Another consideration was the ability to maximize dose fall-off as when targets are close together the aim is to limit the bridging doses.



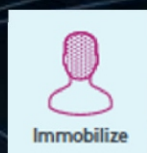


TREATMENT PROTOCOL

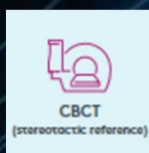
- All targets were treated in 6 sessions over 8 days
- 3 to 7 targets were treated each day
- Rx = 18Gy - 32/34 targets (to 43% - 80% isodose line)
- Rx = 16Gy - 2/34 targets (to 75% and 80% isodose lines)
- Most of the targets were treated with a single shot
- Total # of shots: 45
- Segmentation tool allowed for fast accurate target delineation (minutes to contour them all)

WORKFLOW

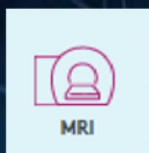
Targets were treated in six sessions over eight days



1. Mask molding

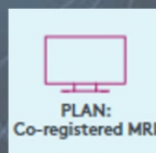


2. Initial CBCT



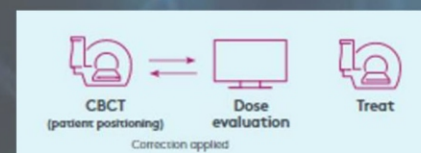
3. Brain MRI

Steps 1 through 3 were carried out prior to the first radiosurgery session



4. Dose planning

- Repeated for multiple days to treat all the targets.
- Each day, new plan was generated (using the 'replan' function)



5. Treatment delivery

- CBCT to verify actual skull position
- Automatic co-registration to determine daily shift in translation and rotation
- Automatic adaption by TPS to daily position; recalculation of dose distribution

Steps 4 and 5 were repeated during each of the six sessions

RESULTS

- Patient had an excellent response to treatment, with the majority of tumors either regressing or completely resolving at 3 months with no new metastases. The response persisted at 9 months.
- He remains neurocognitively intact and continued to work.
- The patient was not fatigued and did not require steroids.
- At the last follow up his disease was under control with no progression intra-cranially nor extra-cranially
- He remains on current Osimertinib systemic therapy.