Post-Irradiation Changes and Complications of Nasopharyngeal Carcinoma: A Review of Imaging Features

Jacky CY Lau, Joyce HM Cheng, Shiobhon Y Luk, Jennifer LS Khoo
Department of Radiology, Pamela Youde Nethersole Eastern Hospital, Chai Wan, Hong Kong SAR, China

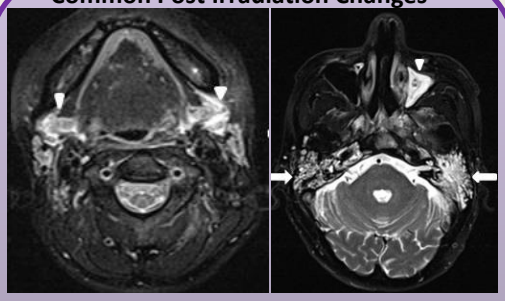
Objective:

To review the imaging features of common irradiation changes at various stages of treatment and the broad spectrum of post-irradiation complications in NPC patients

Methods and Materials:

Retrospective review of post-irradiation NPC patients with follow-up imaging performed in our institution between the period 2012 to 2018, excluding patients with active disease recurrence.

Common Post Irradiation Changes

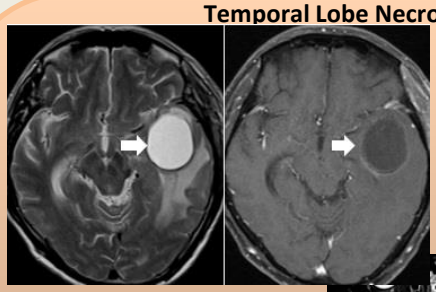


Glandular damage- T2 hyperintense signals (arrowheads) at bilateral submandibular glands, compatible with sialadenitis.

Sinomastoditis- mucosal thickening at left maxillary sinus (arrowhead). Effusion at bilateral mastoid air cells (arrows).

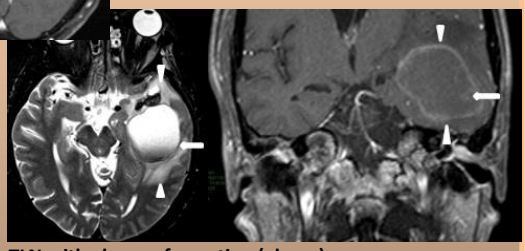
Radiation induced osteitis- Patchy sclerotic and lytic changes at the skull base on axial CT bone window, compatible with RIO (arrows). Mucosal thickening at both sphenoid sinuses, (arrowheads).

Temporal Lobe Necrosis (TLN)



TLN with cyst formation- Cystic structure at left temporal lobe (arrows) on background TLN as shown on T2W and post contrast T1W with fat saturation sequences. Surgical drainage and excision was performed with histology confirming radionecrosis.

TLN with haemorrhage (below)- A lobulated T2W hyperintense lesion with hypointense rim (arrow) at the medial left temporal lobe, compatible with hemosiderin deposition related to prior hemorrhage.

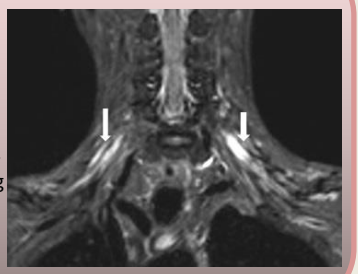


TLN with abscess formation (above)- Cystic lesion with fluid-fluid level at the left temporal lobe (arrow), with surrounding vasogenic oedema and mass effect (arrowheads). Rim enhancement (arrowheads) and internal thin enhancing septum (arrow) are shown. Surgical drainage was performed and specimen grew Bacillus species.

Cranial Nerve Palsy & Brachial Plexopathy

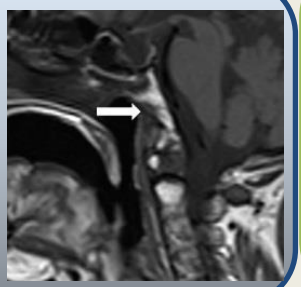
CN XII palsy (right)- Coronal T1W shows atrophy of left hemi tongue (arrow)

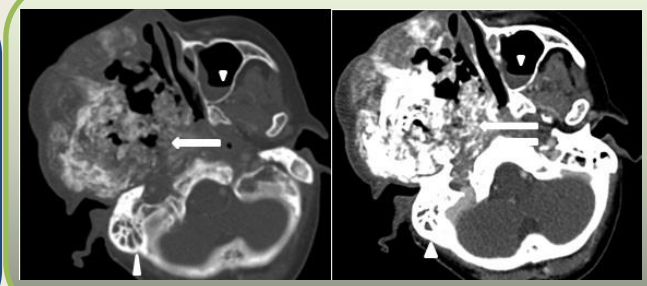
Brachial plexopathy (left)- Diffuse fusiform thickening with STIR-hyperintense signal, involving bilateral brachial plexuses, worse on the left (arrows).



Osteoradionecrosis

Heterogeneous signal with cortical disruption at the anterior aspect of clivus (arrows) on this sagittal T1W sequence. Findings were persistent with no evidence of recurrence up to 3-year interval.



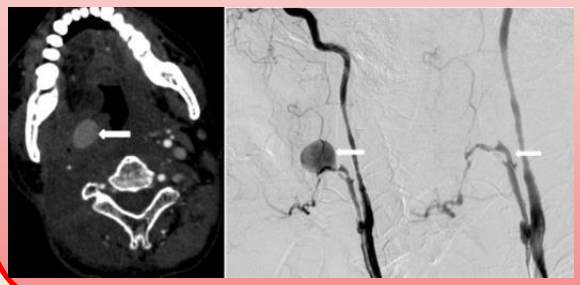


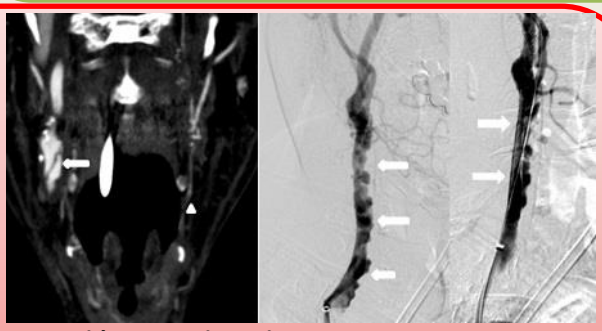
Secondary Osteosarcoma

Histology proven high-grade sarcoma on axial CT in bone and soft tissue windows (arrows) with mastoid and maxillary effusions (arrowheads)

Pseudoaneurysm Formation

Large pseudoaneurysm of right tonillar artery on CT angiogram (CTA) and digital subtraction angiography (DSA), with successful coil embolization performed. (arrows)





Carotid Artery Dissection

Right common carotid artery dissection on CTA and DSA with successful stenting performed (arrows). Long segment of severe left CCA stenosis on CTA (arrowhead)

Conclusion:

Radiologists' knowledge and familiarization of the imaging features is essential in post-irradiation imaging surveillance . Imaging features atypical of post irradiation changes and complications should raise suspicions of disease recurrence.