

Revisiting the “Tram-Track” sign

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Key words: Breast cancer, meningioma, metastasis, neuritis, optic nerve

A 55-year-old female presented with a 3-week-old history of sudden decrease in vision in the right eye. Visual acuity was 20/1200 (right eye) and 20/20 (left eye). A relative afferent pupillary defect, proptosis of 2 mm, and disc edema were noted in the right eye [Fig. 1a].

On magnetic resonance imaging, T1-weighted [Fig. 1b] and fat-suppressed T2-weighted images [Fig. 2a and b] demonstrated irregular nodular thickening along the right optic nerve (arrows) with a T2-hypointense nodular deposit on the optic nerve sheath (arrow, 2B). Postcontrast fat-suppressed axial T1-weighted contiguous images [Fig. 2c and d] demonstrate irregular peripheral enhancement of the nodular region (arrow, 2C). In addition, marked enhancement and thickening of the right optic nerve sheath with the central nonenhancing nerve can be seen (arrow, 2D). While an optic nerve sheath meningioma was being considered as a likely diagnosis, a detailed systemic history gave a significant finding: the patient had a history of undergoing lumpectomy, chemotherapy, and radiation to the left breast, six years ago for invasive ductal carcinoma (T2N0M0). On examination, a firm lump was palpable in the left breast. On positron emission tomography imaging, “hot spots” were found in the left breast, liver, right orbit, and multiple bony sites. Percutaneous liver biopsy confirmed the diagnosis of metastatic breast cancer. A cerebrospinal fluid analysis was done subsequently, as requested by the treating oncologist, as a part of her systemic chemotherapy, which was positive for tumor cells. Therefore, this classic “tram-track” appearance [Fig. 2d] was due to leptomeningeal carcinomatosis from breast cancer.

The optic nerve tram-track sign is most commonly seen in optic nerve sheath meningiomas, which typically cause segmental or circumferential enlargement of the optic nerve sheath. On contrast imaging, the nerve can be seen as an unenhanced central linear structure surrounded by the enhanced meningioma.^[1] Other conditions which can present with a tram-track appearance of the optic nerve include inflammatory diseases such as demyelinating optic neuritis, sarcoidosis, idiopathic orbital inflammatory disease, periopitic hemorrhage, leukemic infiltration, Erdheim–Chester disease, and metastases.^[2,3]

Metastases from the breast to the optic nerve can mimic optic nerve sheath meningiomas.^[4,5] Generally speaking, metastases of breast cancer account for the majority of ocular and orbital metastases; however, breast cancer metastasizing specifically to the optic nerve is uncommon, with only a handful of cases being reported.^[6] Furthermore, recurrent breast cancer presenting as vision loss is decidedly rare and can exhibit the tram-track sign on imaging.^[4,7]

Conclusion

Tram-track sign may be a radiological feature of optic nerve metastasis from breast cancer

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Conflicts of interest

There are no conflicts of interest.

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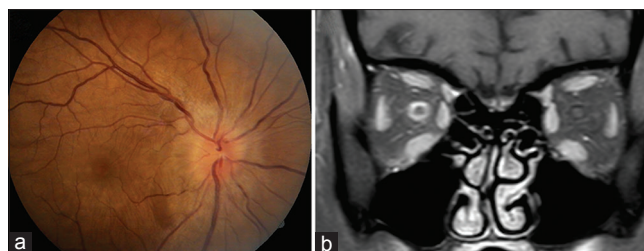


Figure 1: (a) Disc edema in the right eye. (b) Is a coronal, postcontrast fat-suppressed T1-weighted image showing enhancement and thickening of the right optic nerve sheath with the central nonenhancing nerve

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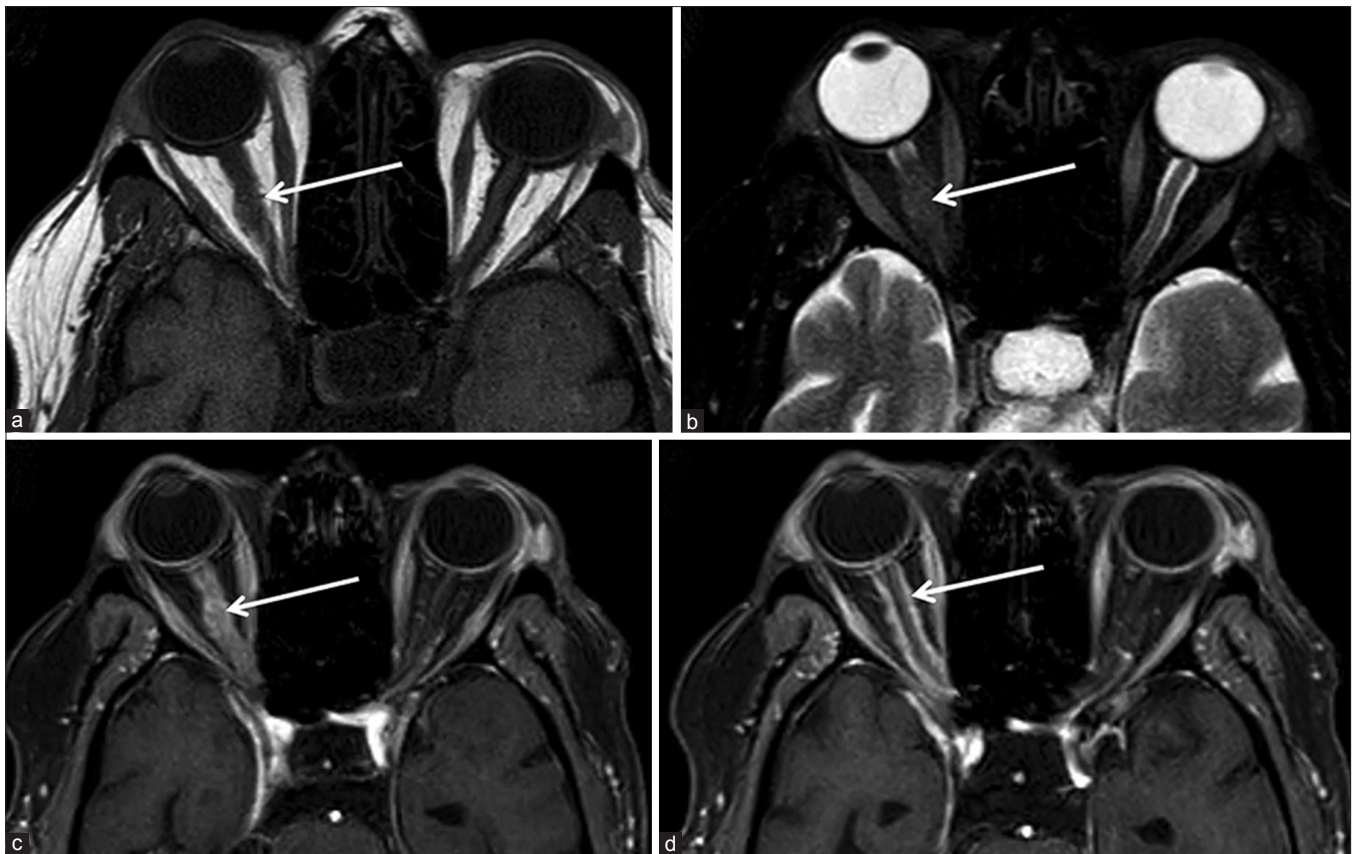


Figure 2: (a and b) are axial T1-weighted and fat-suppressed T2-weighted images, respectively, which show irregular nodular thickening along the right optic nerve (arrows) with a T2-hypointense nodular deposit on the optic nerve sheath (arrow, 2b). Postcontrast fat-suppressed axial T1-weighted contiguous images through the orbit (c and d) demonstrate irregular peripheral enhancement of the nodular region (arrow, 2c). The classical tram-track appearance is seen in figure 2D (arrow)

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