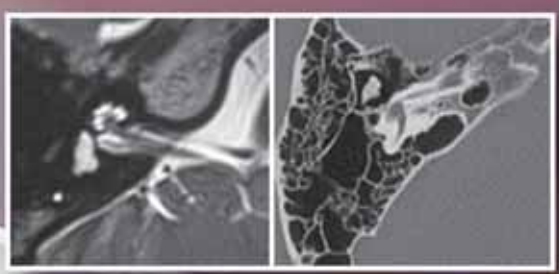
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## Clinico Radiological Series

# TEMPORAL BONE IMAGING



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# 18 Reporting Template with Illustrative Cases

*(Tumors)*

*Smita Manchanda, Manisha Jana*

## REPORTING TEMPLATE

*Right* *Left*

- External ear:
  - External auditory canal (EAC) wall bony erosion (Absent/Partial/Complete)
  - Soft tissue involvement (Absent/<5 mm/>5 mm)
- Middle ear:
  - Soft tissue density (Present/Absent)
  - Ear ossicles (Intact/Eroded)
  - Bone erosion:
    - Tegmen tympani
    - Sigmoid plate
    - Facial nerve canal
- Inner ear:
  - Internal auditory canal (Normal/Enlarged)
  - Cochlea (Normal/Eroded)
  - Vestibule (Normal/Eroded)
- Mastoid air cells (Normal/Opacified/Sclerotic)
- Petrous apex (Normal/Eroded)
- Clivus (Normal/Eroded)
- Jugular foramen (Normal/Eroded/Enlarged)
- Carotid canal (Normal/Eroded)
- Foramen lacerum (Normal/Eroded)
- Cavernous sinus extension (Present/Absent)
- Intracranial extension (Present/Absent)
- Dural extension
- Extradural (Absent/<2 cm/>2 cm)
- Intradural (A/<2 cm/2–4 cm/>4 cm)
- Infratemporal fossa extension (Present/Absent)
- Lymph nodes [mention separation anxiety disorder (SAD) if involved and unilateral (U/L) or bilateral (B/L)]:
  - Level I
  - Level II
  - Level III
  - Level IV
  - Level V
  - Level VI
- Metastases (mention site)
- Any other finding

**Key:** A: Absent; C: Complete; E: Eroded; I: Intact; En: Enlarged; N: Normal; Op: Opacified; P: Present; Pa: Partial; Pn: Pneumatized; Sc: Sclerotic

## IMPRESSION

### Staging (Refer to Chapter 16)

- TNM (for EAC carcinoma)
- Fisch (for glomus jugulotympanicum)

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## CASE 1 (FIGS. 1A TO F)

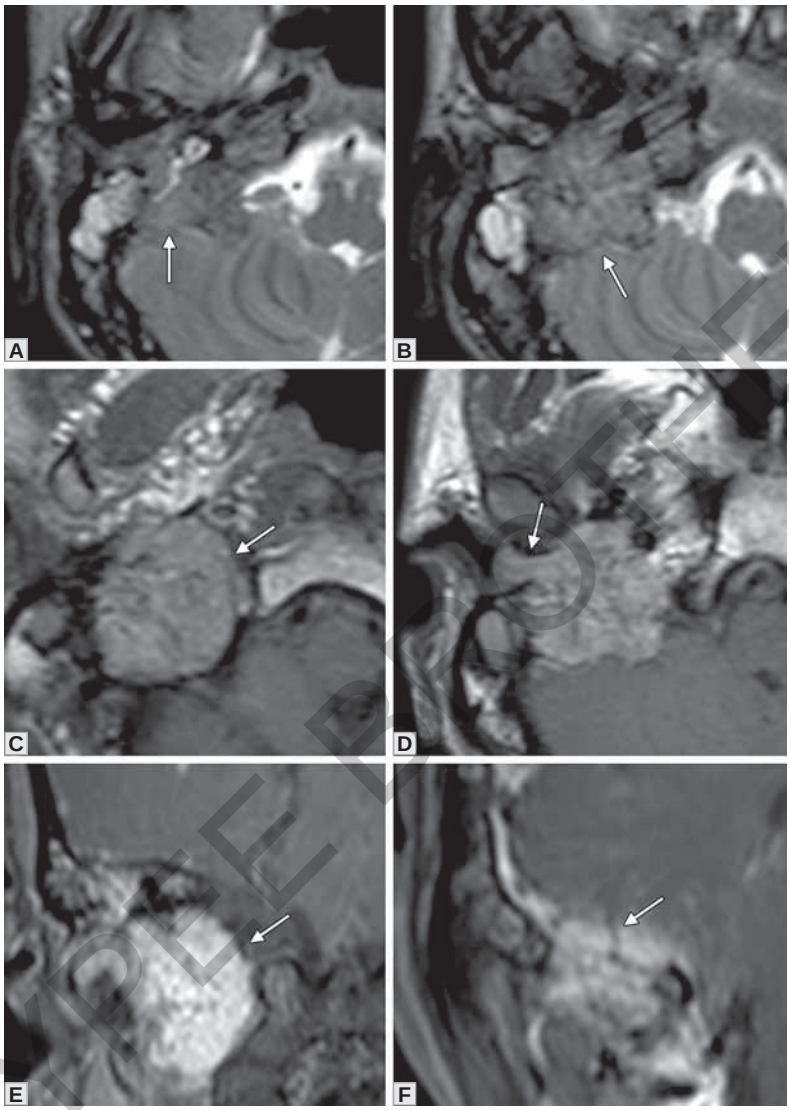
A 22-year-old male presenting with right-sided hearing loss.

Mass lesion (measuring 3.5 × 3.3 × 3.0 cm) in the right jugular fossa and middle ear cavity which is of intermediate to hyperintense signal intensity (SI) on T1-weighted image (T1WI) and intermediate to hypointense on T2WI with heterogeneous postcontrast enhancement and extent as described below.

| | *Right* | *Left* |
|---|---|---|
| • External ear (**Fig. 1D**): | | |
| ◦ EAC wall bony erosion (Absent/Partial/Complete) | ***Pa*** | A |
| ◦ Soft tissue involvement (Absent/<5 mm/>5 mm) | ***>5 mm*** | A |
| • Middle ear: | | |
| ◦ Soft tissue density (Present/Absent) | ***P*** | A |
| ◦ Ear ossicles (Intact/Eroded) | I | I |
| ◦ Bone erosion: | | |
| – Tegmen tympani | I | I |
| – Sigmoid plate | I | I |
| – Facial nerve canal | I | I |
| • Inner ear: | | |
| ◦ Internal auditory canal (Normal/Enlarged) | N | N |
| ◦ Cochlea (Normal/Eroded) | *E* | N |
| ◦ Vestibule (Normal/Eroded) | N | N |
| • Mastoid air cells (Normal/Opacified/Sclerotic) | ***Op*** | N |
| • Petrous apex (Normal/Eroded) | N | N |
| • Clivus (Normal/Eroded) | N | N |
| • Jugular foramen (Normal/Eroded/Enlarged) | ***En*** | N |
| • Carotid canal (Normal/Eroded) | *E* | N |
| • Foramen lacerum (Normal/Eroded) | N | N |
| • Cavernous sinus extension (Present/Absent) | A | A |
| • Intracranial extension (Present/Absent) | P | P |
| • Dural extension (**Figs. 1E** and **F**) | | |
| • Extradural (Absent/<2 cm/>2 cm) | <2 cm | A |
| • Intradural (A/<2 cm/2–4 cm/>4 cm) | A | A |
| • Infratemporal fossa extension (Present/Absent) | A | A |
| • Lymph nodes (mention SAD if involved and U/L or B/L): | A | A |
| ◦ Level I | | |
| ◦ Level II | | |
| ◦ Level III | | |
| ◦ Level IV | | |
| ◦ Level V | | |
| ◦ Level VI | | |
| • Metastases (mention site) | A | A |

**Key:** A: Absent; C: Complete; E: Eroded; En: Enlarged; I: Intact; N: Normal; Op: Opacified; P: Present; Pa: Partial; Pn: Pneumatized; Sc: Sclerotic

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**FIGS. 1A TO F: Right glomus jugulotympanicum with extradural extension. Fisch Stage D1.** (A and B) Axial T2FS showing T2 hypointense mass with extradural extension (arrows) (C and D) Axial T1 WI. Intermediate SI on T1 WI (arrow in C). Arrow in D shows the EAC extension. (E and F) Coronal Post gad T1 WI showing enhancing mass with extradural extension (arrows).

## Impression

Right glomus jugulotympanicum with extradural extension.

### *Staging*

Fisch stage D1.

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## CASE 2 (FIGS. 2A TO F)

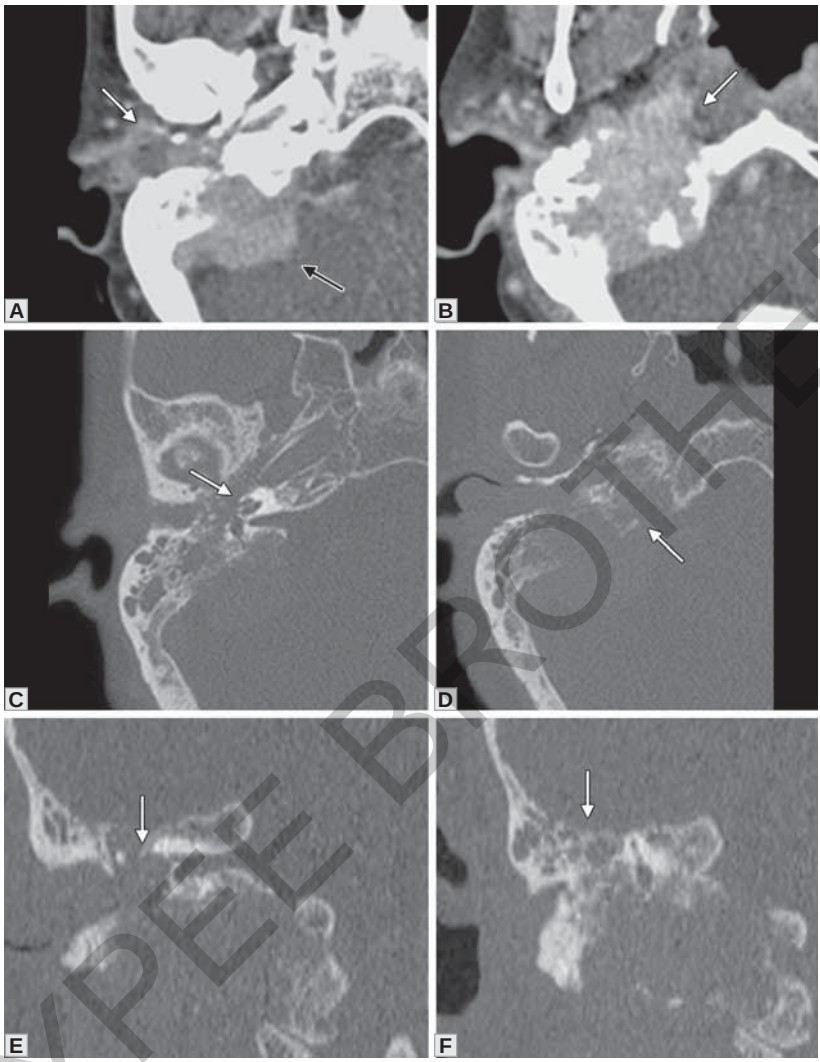
A 50-year-old female presenting with right-sided ear obstruction.

Heterogeneously enhancing mass lesion centered in the right middle ear cavity and jugular fossa (measuring 4.2 × 3.4 × 4.1 cm) with extent as described below.

| | *Right* | *Left* |
|---|---|---|
| • External ear (**Figs. 2A** and **B**): | | |
| ◦ EAC wall bony erosion (Absent/Partial/Complete) | ***Pa*** | A |
| ◦ Soft tissue involvement (Absent/<5 mm/>5 mm) | ***>5 mm*** | A |
| • Middle ear: | | |
| ◦ Soft tissue density (Present/Absent) | ***P*** | A |
| ◦ Ear ossicles (Intact/Eroded) | ***E*** | I |
| ◦ Bone erosion: | | |
| – Tegmen tympani (**Fig. 2F**) | ***E*** | I |
| – Sigmoid plate | ***I*** | I |
| – Facial nerve canal (**Fig. 2E**) | **E** | I |
| • Inner ear: | | |
| o Internal auditory canal (Normal/Enlarged) | N | N |
| o Cochlea (Normal/Eroded) (**Fig. 2C**) | ***E*** | N |
| o Vestibule (Normal/Eroded) (**Fig. 2F**) | ***E*** | N |
| • Mastoid air cells (Normal/Opacified/Sclerotic) (**Figs. 2C** and **D**) | ***Op*** | N |
| • Petrous apex (Normal/Eroded) (**Fig. 2D**) | ***E*** | N |
| • Clivus (Normal/Eroded) | ***E*** | N |
| • Jugular foramen (Normal/Eroded/Enlarged) | ***En*** | N |
| • Carotid canal (Normal/Eroded) | ***E*** | N |
| • Foramen lacerum (Normal/Eroded) | N | N |
| • Cavernous sinus extension (Present/Absent) | A | A |
| • Intracranial extension (Present/Absent) | ***P*** | A |
| • Dural extension (**Fig. 2A**) | | |
| • Extradural (Absent/<2 cm/>2 cm) | ***<2 cm*** | A |
| • Intradural (A/<2 cm/2–4 cm/>4 cm) | A | A |
| • Infratemporal fossa extension (Present/Absent) | ***P*** | A |
| • Lymph nodes (mention SAD if involved and U/L or B/L): | A | A |
| o Level I | | |
| o Level II | | |
| o Level III | | |
| o Level IV | | |
| o Level V | | |
| o Level VI | | |
| • Metastases (mention site) | A | A |

**Key:** A: Absent; C: Complete; E: Eroded; En: Enlarged; I: Intact; N: Normal; Op: Opacified; Pa: Partial; P: Present; Pn: Pneumatized; Sc: Sclerotic

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**FIGS. 2A TO F: Right glomus jugulotympanicum with extradural extension. Fisch Stage D1.** (A) Heterogeneously enhancing mass with extension to external auditory canal (white arrow) with extradural extension (black arrow). (B) Mass extending to nasopharynx (arrow). (C) Erosion of apical turn of cochlea (arrow). (D) Extension to petrous apex (arrow). (E) Erosion of facial canal (arrow). (F) Erosion of tegmen tympani (arrow).

## Impression

Right glomus jugulotympanicum with extradural extension.

### *Staging*

Fisch stage D1.

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## CASE 3 (FIGS. 3A TO F)

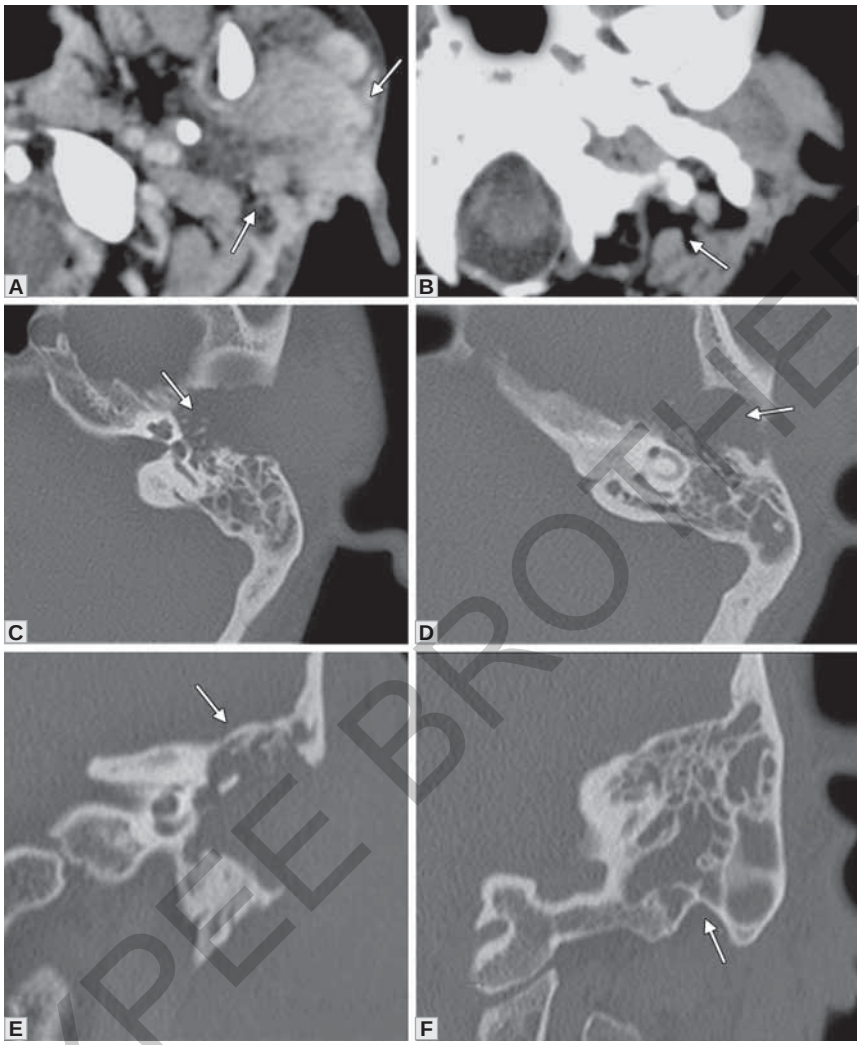
A 38-year-old female presenting with left sided hearing loss.

Heterogeneously enhancing mass lesion (measuring 3.5 × 3.2 × 3.4 cm) in the left external ear cavity with extension into the middle ear and infratemporal fossa (**Figs. 3A** to **D**) as detailed below.

| | *Right* | *Left* |
|---|---|---|
| • External ear (**Figs. 3A** and **B**): | | |
| ◦ EAC wall bony erosion (Absent/Partial/Complete) | A | ***Pa*** |
| ◦ Soft tissue involvement (Absent/<5 mm/>5 mm) | A | ***>5 mm*** |
| • Middle ear (**Figs. 3C** to **E**): | | |
| ◦ Soft tissue density (Present/Absent) | A | ***P*** |
| ◦ Ear ossicles (Intact/Eroded) | I | ***E*** |
| ◦ Bone erosion: | I | I |
| – Tegmen tympani | I | I |
| – Sigmoid plate | I | I |
| – Facial nerve canal | | |
| • Inner ear: | | |
| ◦ Internal auditory canal (Normal/Enlarged) | N | N |
| ◦ Cochlea (Normal/Eroded) | N | N |
| ◦ Vestibule (Normal/Eroded) | N | N |
| • Mastoid air cells (Normal/Opacified/Sclerotic) (**Fig. 3F**) | N | ***Op*** |
| • Petrous apex (Normal/Eroded) | N | N |
| • Clivus (Normal/Eroded) | N | N |
| • Jugular foramen (Normal/Eroded/Enlarged) | N | N |
| • Carotid canal (Normal/Eroded) | N | N |
| • Foramen lacerum (Normal/Eroded) | N | N |
| • Cavernous sinus extension (Present/Absent) | A | A |
| • Intracranial extension (Present/Absent) | A | A |
| • Dural extension: | | |
| ◦ Extradural (Absent/<2 cm/>2 cm) | A | A |
| ◦ Intradural (A/<2 cm/2–4 cm/>4 cm) | A | A |
| • Infratemporal fossa extension (Present/Absent) | A | ***P*** |
| • Lymph nodes (mention SAD if involved and U/L or B/L) (**Figs. 3A** and **B**): | A | P |
| ◦ Level I | | |
| ◦ Level II | | |
| ◦ Level III | | |
| ◦ Level IV | | |
| ◦ Level V | | |
| ***Few Left LN (SAD 1.3 cm)*** | | |
| ◦ Level VI | A | A |
| • Metastases (mention site) | | |

**Key:** A: Absent; C: Complete; E: Eroded; En: Enlarged; I: Intact; N: Normal; Op: Opacified; P: Present; Pa: Partial; Pn: Pneumatized; Sc: Sclerotic

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**FIGS. 3A TO F: Malignant left external auditory meatus mass; Stage 4 (T4N1Mx).** (A) Large heterogeneously enhancing EAC mass (thin arrow). (B) Left Level V lymph nodes (thick arrow in A and B). (C) Ossicle erosion (arrow). (D) Middle ear extension (arrow). (E) Intact tegmen tympani (arrow). (F) Opacified mastoid air cells (arrow).

## Impression

Mass lesion left external auditory meatus likely malignant.

### *Staging*

Stage 4 (T4N1Mx).

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## CASE 4 (FIGS. 4A TO F)

For tumor extent of biopsy proven facial schwannoma in a 25-year-old male who had presented with right-sided ear obstruction.

Mass lesion in the right middle ear cavity which is isointense (to gray matter) on T1WI (**Fig. 4A**) and T2WI (**Fig. 4C**) with few cystic areas and heterogeneous enhancement and extent as described below.

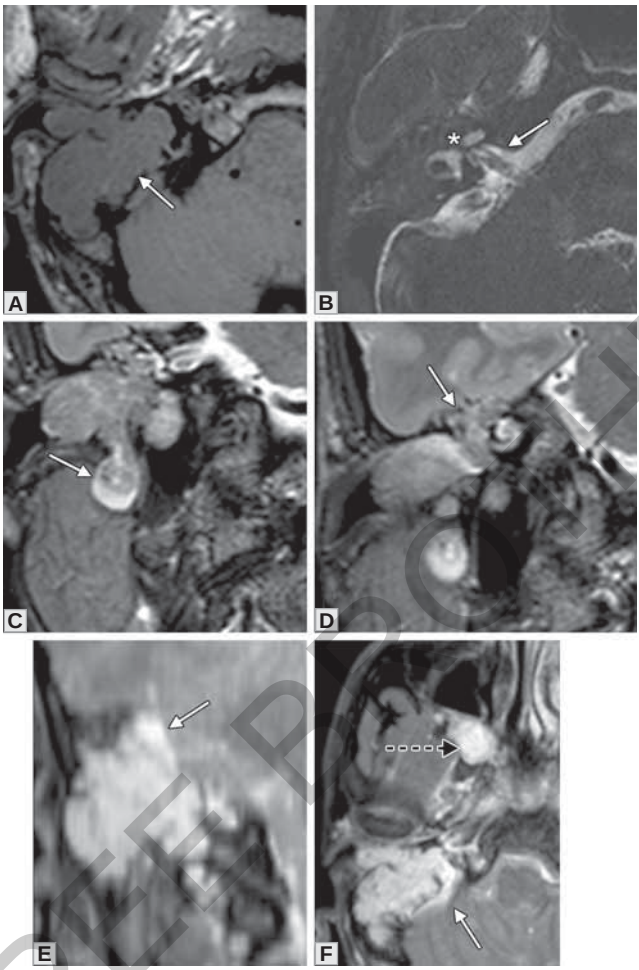
| | *Right* | *Left* |
|---|---|---|
| • External ear: | | |
| ◦ EAC wall bony erosion (Absent/Partial/Complete) | A | A |
| ◦ Soft tissue involvement (Absent/<5 mm/>5 mm) | A | A |
| • Middle ear (**Figs. 4C** and **D**): | | |
| ◦ Soft tissue density (Present/Absent) | ***P*** | A |
| ◦ Ear ossicles (Intact/Eroded) | I | I |
| ◦ Bone erosion: | | |
| – Tegmen tympani | *E* | I |
| – Sigmoid plate | I | I |
| – Facial nerve canal | *E* | I |
| • Inner ear (**Fig. 4B**): | | |
| ◦ Internal auditory canal (Normal/Enlarged) | N | N |
| ◦ Cochlea (Normal/Eroded) | N | N |
| ◦ Vestibule (Normal/Eroded) | N | N |
| • Mastoid air cells (Normal/Opacified/Sclerotic) | ***Op*** | N |
| • Petrous apex (Normal/Eroded) | N | N |
| • Clivus (Normal/Eroded) | N | N |
| • Jugular foramen (Normal/Eroded/Enlarged) | N | N |
| • Carotid canal (Normal/Eroded) | N | N |
| • Foramen lacerum (Normal/Eroded) | N | N |
| • Cavernous sinus extension (Present/Absent) | A | A |
| • Intracranial extension (Present/Absent) (**Figs. 4E** and **F**) | ***P*** | ***P*** |
| • Dural extension (**Fig. 4E**) | | |
| • Extradural (Absent/<2 cm/>2 cm) | ***<2 cm*** | A |
| • Intradural (A/<2 cm/2–4cm/>4 cm) | A | A |
| • Infratemporal fossa extension (Present/Absent) | A | A |
| • Lymph nodes (mention SAD if involved and U/L or B/L): | A | A |
| ◦ Level I | | |
| ◦ Level II | | |
| ◦ Level III | | |
| ◦ Level IV | | |
| ◦ Level V | | |
| ◦ Level VI | | |
| • Metastases (mention site) | A | A |

### Any Other Finding

Extension into the parotid gland (**Fig. 4C**) and intracranial extradural location is seen. Another similar heterogeneously enhancing mass lesion seen in the retroantral location (**Fig. 4F**).

**Key:** A: Absent; C: Complete; E: Eroded; En: Enlarged; I: Intact; N: Normal; Op: Opacified; P: Present; Pa: Partial; Pn: Pneumatized; Sc: Sclerotic

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**FIGS. 4A TO F: Right facial nerve schwannoma.** (A) Isointense mass lesion in right middle ear cavity (arrow) on T1WI. (B) Axial 3D heavily T2 WI (FIESTA). Hypointense mass along the first genu (*) and tympanic segment. Normal cisternal segment (arrow). (C) Coronal T2FS shows intraparotid extension (arrow). (D) Coronal T2FS shows extradural extension (arrow). (E) Coronal Post gad T1 WI shows heterogeneously enhancing mass with extradural extension (arrow). (F) Axial Post gad T1 WI shows another similar heterogeneously enhancing mass lesion (dashed arrow) in the retroantral location (mandibular nerve schwannoma).

## Impression

Right facial nerve schwannoma with extension into locations as described above (mastoids, middle ear, external ear, parotid gland, and intracranial extradural) with small right mandibular nerve schwannoma.

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