



NCG GUIDELINES- 2019

Thoracic Malignancies Management Guidelines

Categories of the guidelines

- a) Essential
- b) Optimal
- c) Optional

**Herewith essential will be referred as (a), optimal as (b) and optional as (c)*

Content

1.	Management of Non-Small Cell Lung Cancer (NSCLC)	04
2.	Management of Small Cell Lung Cancer (SCLC)	06
3.	Management of Mesothelioma	07
4.	Procedures in Lung cancer	08
5.	Management of mediastinal tumors	12
6.	Management of chest wall tumors	13
7.	Management of Pleural effusion	15
8.	Management of esophageal cancer	16
9.	Procedures in Esophageal cancer	17
10.	Abbreviations	21
11.	Annexure -1. Radiology synoptic reporting formats	22
12.	Annexure -2. Pathology synoptic reporting formats	26

MANAGEMENT OF NON-SMALL CELL LUNG CANCER (NSCLC)

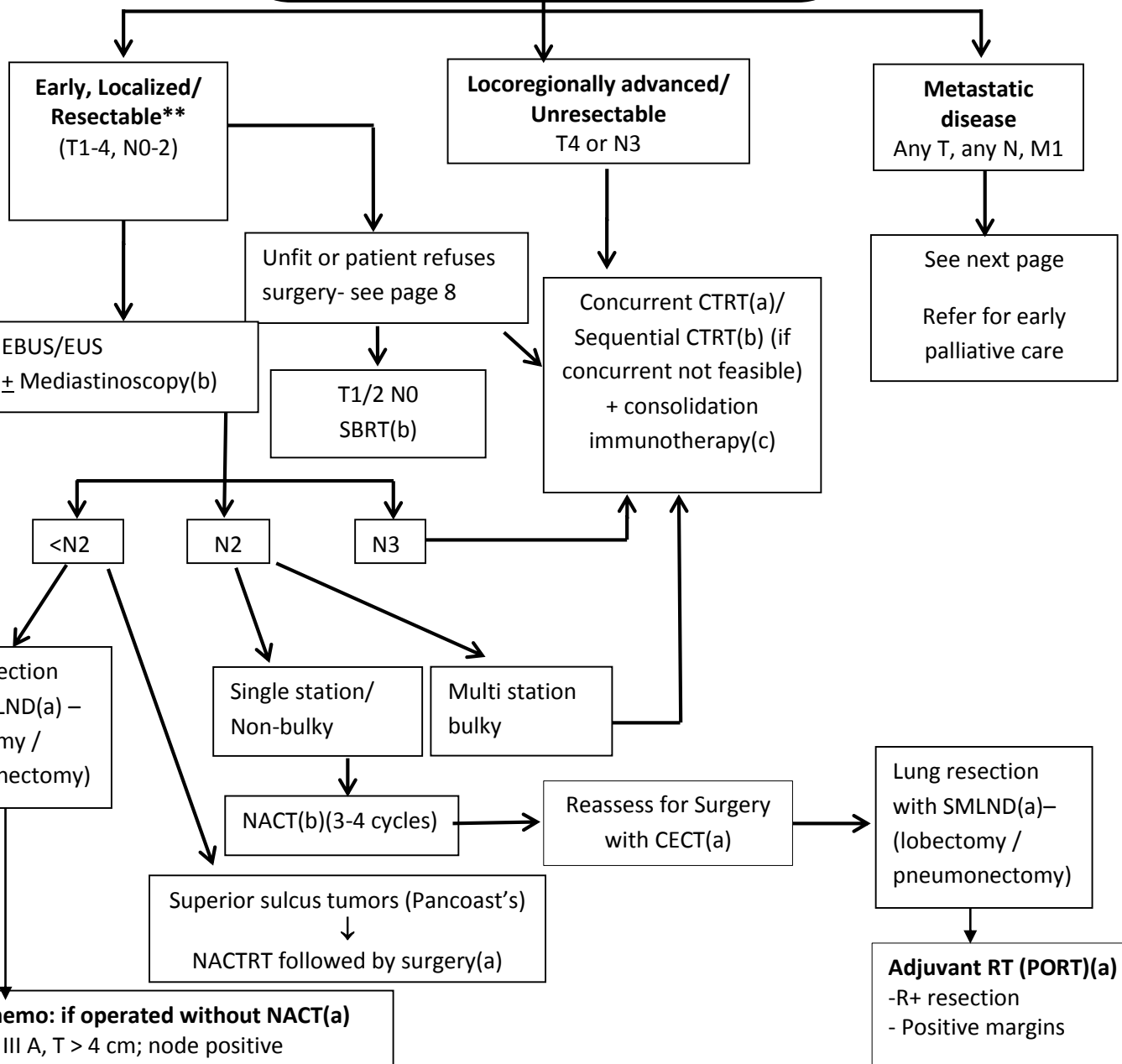
**AT DIAGNOSIS
 EXAMINATION:**

Performance status; General and systemic examination

INVESTIGATIONS:

1. CBC, LFT, RFT, Coagulation profile, Viral markers(a)
2. CECT Thorax, abdomen and Pelvis(a)
3. Biopsy and histopathology report(a)
4. EGFR(a), ALK(a), ROS1(a), MET(b), PDL1(b)
5. PET-Scan(b) and MRI brain(b)
6. MRI Thorax for Superior sulcus tumour(b)
7. Bronchoscopy in patients planned for surgery(b)

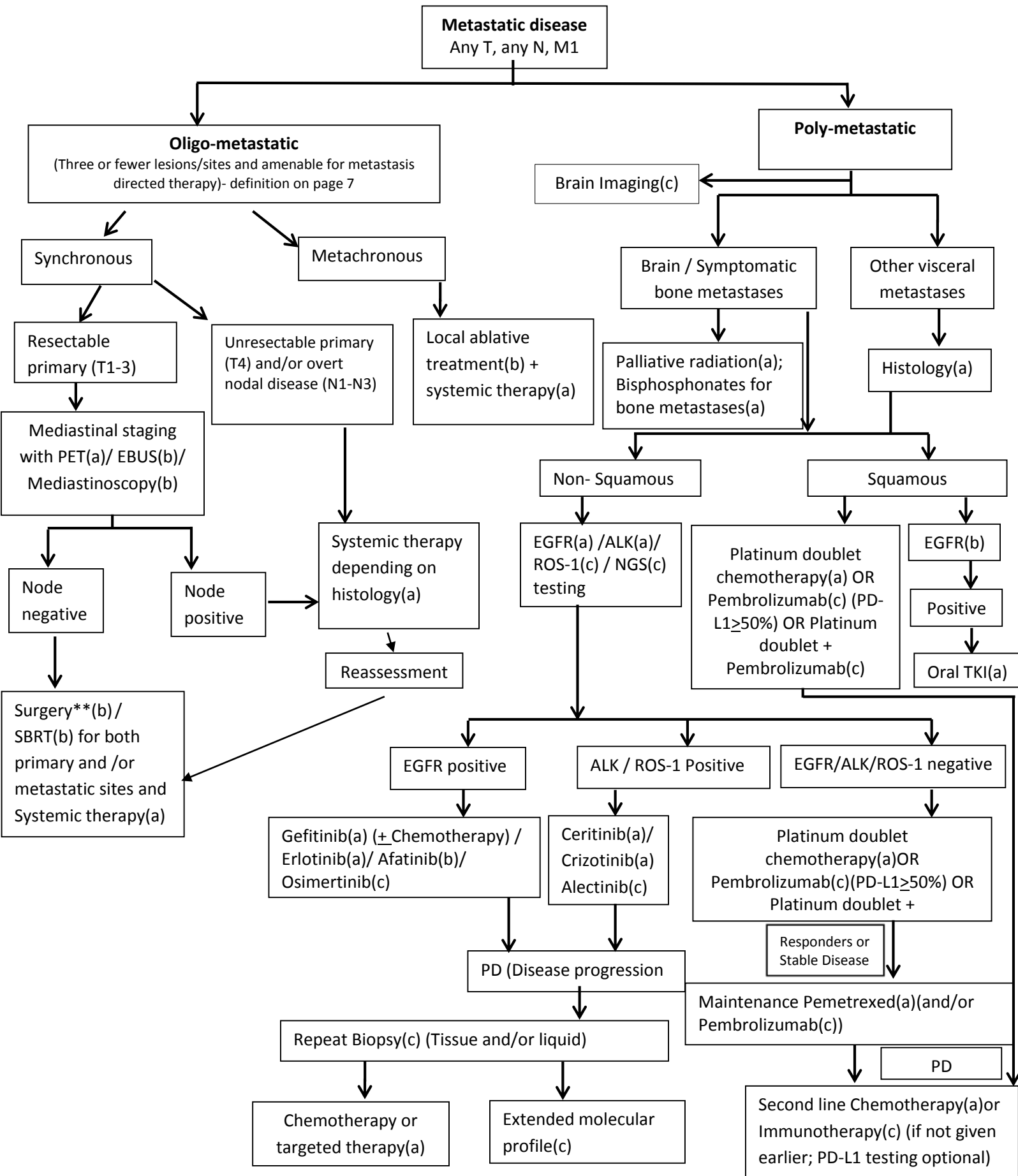
Peripheral T1N0 (PET Node negative) does not require further metastatic work up (Brain imaging) or mediastinal staging)



Adjuvant chemo: if operated without NACT(a)
 Stage II and III A, T > 4 cm; node positive
Adjuvant RT (PORT: after Chemo)(a)
 - R+ resection
 - Positive margins

Adjuvant RT (PORT)(a)
 - R+ resection
 - Positive margins

National Cancer Grid Thoracic Malignancies Management Guidelines 2019



MANAGEMENT OF SMALL CELL LUNG CANCER (SCLC)

AT DIAGNOSIS

EXAMINATION:

Performance status; General and systemic examination

INVESTIGATIONS:

1. CBC, LFT, RFT, Coagulation profile, Viral markers(a)
2. CECT Thorax, abdomen and Pelvis(b)
3. Biopsy and histopathology report(a)
4. PET-Scan and MRI brain(a)
5. Bronchoscopy in patients planned for surgery(a)

Non-metastatic disease
 (T1-4, N0-3)

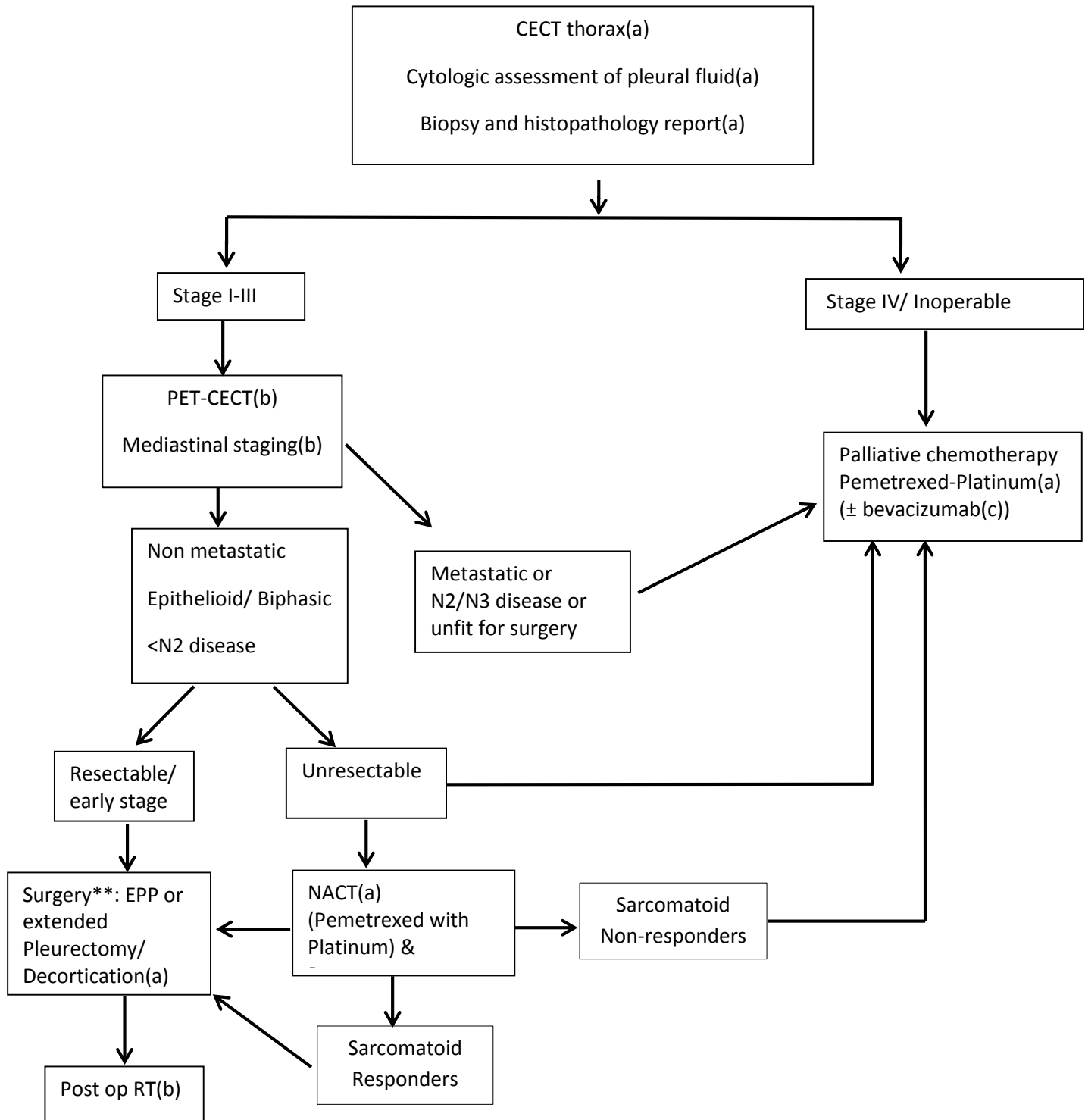
Metastatic disease
 Any T, any N, M1

Palliative chemotherapy(a) +/-
 Immunotherapy(c)
 WBRT for brain mets(a)
 Palliative RT for symptomatic
 mets(a)

Concurrent CTRT(a) (RT to start within 9 weeks
 of starting Chemotherapy)
 Prophylactic cranial irradiation(a)
 (PCI; post adjuvant curative treatment)
 Surgery) (b) for T1-2, N0 f/b adjuvant chemo(b)

PCI(a) & Consolidation Thoracic
 Radiation(b) (for responders to
 chemotherapy)

MANAGEMENT OF MESOTHELIOMA



PROCEDURES IN LUNG CANCER

**Surgery
Lobectomy is the standard operation for all lung tumours above 2 cm wherever feasible(a)
Bi-lobectomy- if two lobes involved(a)
Pneumonectomy-central tumours, large masses involving main pulmonary artery/ bronchus, both pulmonary veins(a)
Segmentectomy indicated for tumors < 2cm and Node negative (in patients not fit for lobectomy)(c)
Extra-pleural pneumonectomy / Extended pleurectomy / Decortication
Systematic mediastinal lymph node dissection (SMLND) is recommended

Radiation therapy
<u>Radical / Sequential</u> 60Gy in 30 fractions over 6 weeks: External Beam Image Guided radiotherapy (IGRT) with 3D CRT or IMRT using Linear Accelerator
<u>Adjuvant</u> 50-60Gy in 25-30 fractions over 5-6 weeks: External Beam Image Guided radiotherapy (IGRT) with 3D CRT or IMRT using Linear Accelerator
<u>Prophylactic cranial RT</u> 25Gy in 10 fractions over 2 weeks: External Beam radiotherapy (IGRT) with 2D or 3D CRT technique
<u>Metastatic</u> SRS (Stereotactic radiotherapy) with IGRT – dose depending on size and location SBRT (Stereotactic radiotherapy) with IGRT – 50-60Gy in 3 to 10 fractions Palliative External Beam Radiotherapy for bone/brain/soft tissue metastases: 20-30Gy in 5-10 fractions over 1-2 weeks Endobronchial Brachytherapy: 4-6Gy – 1 to 3 sittings alone or in combination with external beam RT
<u>Mesothelioma</u> Adjuvant - 45-55.8Gy in 25-31 fractions to hemithorax over 5-6 weeks using Intensity modulated RT Palliative - 20-30Gy in 5-10 fractions to appropriate site over 1-2 weeks using conventional or conformal radiation therapy

Oligo-metastases (OM): radical treatment is technically feasible with acceptable toxicity, with all sites being amenable to local treatment modality that can modify the course of the disease and provides an opportunity for long-term disease control. Maximum of 5 metastases and 3 organs, without the presence of diffuse serosal metastases or bone marrow involvement.
Medically inoperable NSCLC: as evaluated in a multidisciplinary joint clinic (surgeon, radiation and medical oncologist, pulmonologist, anaesthetist): Poor respiratory function: Baseline FEV1 and/or DLCO < 40%, post-operative predicted FEV1 < 30%, presence of interstitial lung disease and/or moderate to severe cardiopulmonary or other comorbidities which cannot be further optimized.

<p>Chemotherapy (NSCLC)</p> <p>Neo-adjuvant chemotherapy: Cisplatin 75 mg/m² day + Pemetrexed 500 mg/m² day 1 every 21 days for 4 cycles (For Non-Squamous (Adenocarcinoma) histology) Cisplatin 75 mg/m² day 1 + Gemcitabine 1000-1250 mg/m² days 1 and 8, every 21 days for 4 cycles (For Squamous histology) Cisplatin 75 mg/m² day 1 + Docetaxel 75 mg/m² day 1 every 21 days for 4 cycles Cisplatin 50 mg/m² days 1 and 8 + Vinorelbine 25 mg/m² days 1, 8, 15, and 22, every 28 days for 4 cycles Cisplatin 75 mg/m² day 1 + Vinorelbine 25 mg/m² days 1 and 8, every 21 days for 4 cycles Cisplatin 100 mg/m² day 1 + Etoposide 100 mg/m² days 1–3, every 28 days for 4 cycles</p> <p>Chemotherapy Regimens for Patients with Comorbidities or cisplatin ineligible patient *: Carboplatin AUC 5-6 day 1 + Paclitaxel 175 mg/m² day 1, every 21 days for 4 cycle Carboplatin AUC 5-6 day 1 + Gemcitabine 1000 mg/m² days 1 and 8, every 21 days for 4 cycles Carboplatin AUC 5-6 day 1 + Pemetrexed 500 mg/m² day 1 for non-squamous every 21 days for 4 cycles</p>
<p>Concurrent: Preferred (non-squamous): Carboplatin AUC 5 on day 1 + Pemetrexed 500mg/m² on day 1 every 21 days for 4 cycles with concurrent thoracic RT (b)Cisplatin 75 mg/m² on day 1 + Pemetrexed 500 mg/m² on day 1 every 21 days for 3 cycles; concurrent thoracic RT and additional 4th cycles of pemetrexed 500 mg/m² Paclitaxel 50 mg/m² weekly + Carboplatin AUC 2 with concurrent thoracic RT followed by additional 2 cycles every 21 days of Paclitaxel 175-200 mg/m² + carboplatin AUC 5-6 Cisplatin 50 mg/m² on days 1, 8, 29, and 36 + Etoposide 50 mg/m² days 1–5 and 29–33 with concurrent thoracic RT Preferred (squamous) : Paclitaxel 50mg/m² weekly + carboplatin. AUC 2 with concurrent thoracic RT ± additional 2 cycles every 21 days of Paclitaxel 175 to 200 mg/m² and carboplatin AUC 5-6 (a) Cisplatin 50 mg/m² on days 1, 8, 29, and 36; etoposide 50 mg/m² days 1–5 and 29–33; concurrent thoracic RT</p>
<p>Adjuvant Chemotherapy: Cisplatin 75 mg/m² day + Pemetrexed 500 mg/m² day 1 every 21 days for 4 cycles (For Non-Squamous (Adenocarcinoma) histology) Cisplatin 75 mg/m² day 1 + Gemcitabine 1000-1250 mg/m² days 1 and 8, every 21 days for 4 cycles (For Squamous histology) Cisplatin 75 mg/m² day 1 + Docetaxel 75 mg/m² day 1 every 21 days for 4 cycles Cisplatin 50 mg/m² days 1 and 8 + Vinorelbine 25 mg/m² days 1, 8, 15, and 22, every 28 days for 4 cycles Cisplatin 75 mg/m² day 1 + Vinorelbine 25 mg/m² days 1 and 8, every 21 days for 4 cycles Cisplatin 100 mg/m² day 1 + Etoposide 100 mg/m² days 1–3, every 28 days for 4 cycles</p> <p>Chemotherapy Regimens for Patients with Comorbidities or Patients Not Able to Tolerate Cisplatin: Carboplatin AUC 5-6 day 1 + Paclitaxel 175 mg/m² day 1, every 21 days for 4 cycles Carboplatin AUC 5-6 day 1 + Gemcitabine 1000 mg/m² days 1 and 8, every 21 days for 4 cycles Carboplatin AUC 5-6 day 1 + Pemetrexed 500 mg/m² day 1 for non-squamous every 21 days for 4 cycles</p>

Targeted therapy

EGFR mutation positive Tab Gefitinib 250 mg OD till disease progression

Tab Erlotinib 150 mg OPD till disease progression

Tab Afatinib 40 mg OPD till disease progression

Tab Osimertinib 80 mg OPD till disease progression

Cisplatin 75 mg/m² day + Pemetrexed 500 mg/m² day 1 every 21 days for 4-6 cycles with Tab Gefitinib 250 mg OD daily For Non-Squamous (Adenocarcinoma) histology) followed by Pemetrexed 500 mg /m² + Tab Gefitinib 250 mg OD daily maintenance till disease progression

Carboplatin AUC 5 on day 1 + Pemetrexed 500mg/m on day 1 every 21 days for 4-6 cycles with Tab Gefitinib 250 mg OD daily (For Non-Squamous (Adenocarcinoma) histology) followed by Pemetrexed 500mg /m² + Tab Gefitinib 250 mg OD daily maintenance till disease progression

Second line treatment:

Tab Osimertinib 80 mg OD (In patients with T790M mutation positive on progression over first/second generation TKIs (Gefitinib/Erlotinib/Afatinib)

Cisplatin 75 mg/m² day + Pemetrexed 500 mg/m² day 1 every 21 days for 4-6 cycles (For Non-Squamous (Adenocarcinoma) histology) followed by Pemetrexed maintenance till disease progression

Carboplatin AUC 5 on day 1 + Pemetrexed 500mg/m on day 1 every 21 days for 4-6 cycles (For Non-Squamous (Adenocarcinoma) histology) followed by Pemetrexed maintenance till disease progression

Pemetrexed 500 mg/m² every 3 weekly till disease progression

Docetaxel 75 mg/m² for 6 cycles

Gemcitabine 1000 mg /m² day and day 8 every 3 weekly for 6 cycles

Paclitaxel 80 mg /m² weekly till disease progression or unacceptable toxicities

Vinorelbine 30 mg /m² weekly till disease progression or unacceptable toxicities

ALK rearrangement positive:

Tab Crizotinib 250 mg BD till disease progression

Tab Ceritinib 450 mg OD with food

Tab Alectinib 600 mg BD

ALK rearrangement positive second line (Post crizotinib) :

Tab Ceritinib 450 mg OD with food

Tab Alectinib 600 mg BD

Chemotherapy in small cell lung cancer: (SCLC)

Concurrent with RT:

Cisplatin 75 mg/m² day 1 and etoposide 100 mg/m days 1, 2, 3 for 4 cycles

Cisplatin 60 mg/m day 1 and etoposide 120 mg/m days 1, 2, 3 for 4 cycles

Cisplatin 25 mg/m² days 1, 2, 3 and etoposide 100 mg/m² days 1, 2, 3 for 4 cycles

Carboplatin AUC-6 day 1 and etoposide 100 mg/m² days 1, 2, 3 for 4 cycles

EXTENSIVE-STAGE SCLC

Carboplatin AUC 5 day 1 and etoposide 100 mg/m days 1, 2, 3 for 4-6 cycles

Cisplatin 75 mg/m² day 1 and etoposide 100 mg/m² days 1, 2, 3 for 4-6 cycles

Cisplatin 80 mg/m² day 1 and etoposide 80 mg/m² days 1, 2, 3 for 4-6 cycles

Cisplatin 25 mg/m² days 1, 2, 3 and etoposide 100 mg/m² days 1, 2, 3 for 4-6 cycles

Carboplatin AUC 5 day 1 and irinotecan 50 mg/m days 1, 8, 15 for 4-6 cycles

Cisplatin 60 mg/m² day 1 and irinotecan 60 mg/m² days 1, 8, 15 for 4-6 cycles

Cisplatin 30 mg/m² days 1, 8 and irinotecan 65 mg/m² days 1, 8 for 4-6 cycles

Carboplatin AUC 5 day 1 and etoposide 100 mg/m² days 1, 2, 3 and atezolizumab 1,200 mg day 1 every 21 days x 4 cycles followed by maintenance atezolizumab 1,200 mg day 1, every 21 days

Carboplatin AUC 5-6 day 1 and etoposide 80-100 mg/m² days 1, 2, 3 and durvalumab 1,500 mg day 1 every 21 days x 4 cycles followed by maintenance durvalumab 1,500 mg day 1 every 28 days

SCLC SUBSEQUENT SYSTEMIC THERAPY: Relapsed within 6 month :

Topotecan PO or IV : 2.3 mg/m²/day orally once daily for 5 consecutive days repeated every 21 days for 6 cycles

Paclitaxel 80 mg/m² weekly till disease progression or toxicities

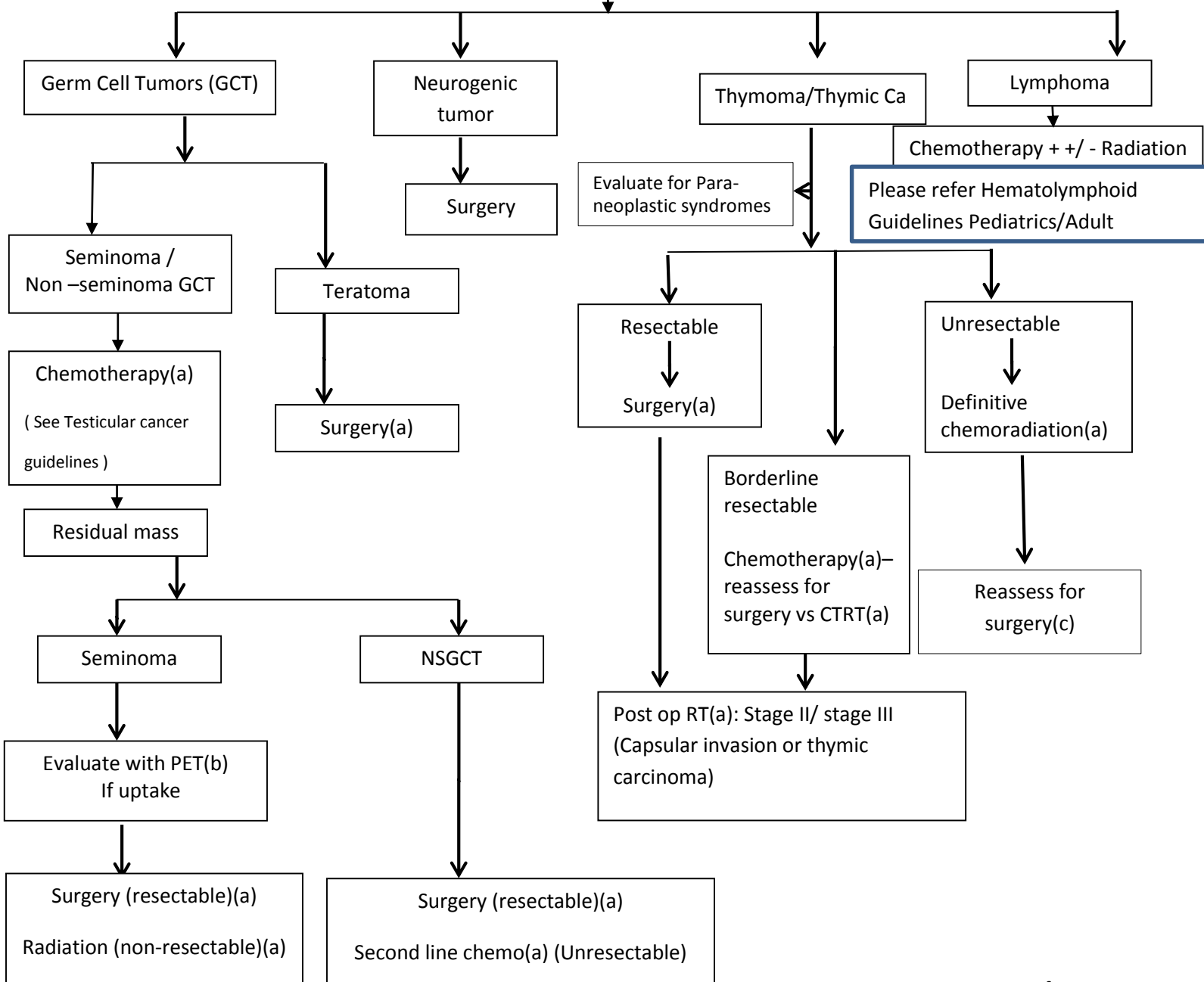
Irinotecan at 100 mg /m² on days 1, 8, and 15 every 4 weeks for 6 cycles

Irinotecan at 300 mg/m² on every 3 weekly for 6 weekly

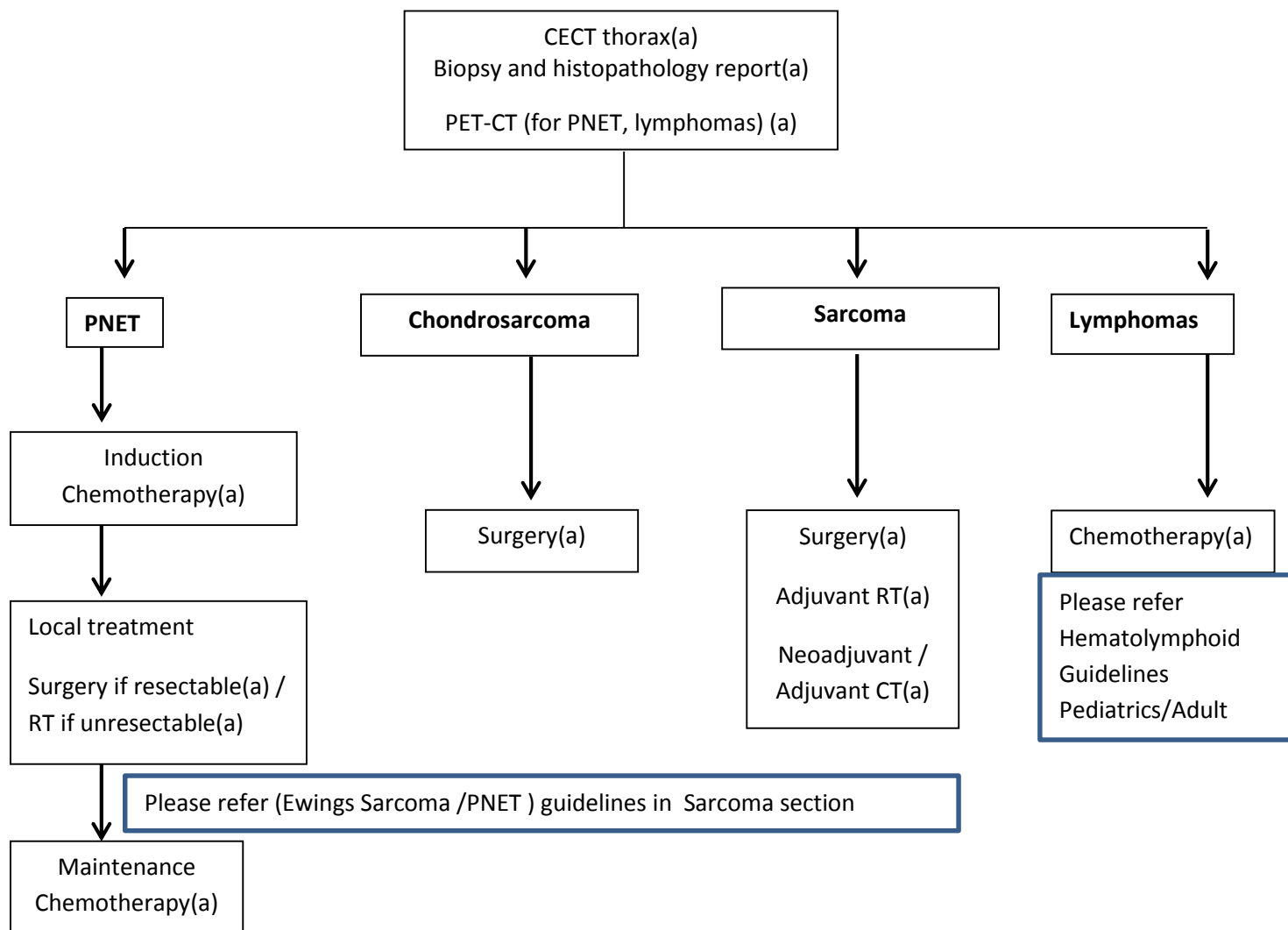
MANAGEMENT OF MEDIASTINAL TUMOURS

AT DIAGNOSIS

CBC with peripheral smear(a)
 CECT scan thorax and guided biopsy(a)
 Tumor markers (AFP, β -HCG, LDH) (a)
 USG Tests(a)
 PET-CT (for PNET, lymphomas)(b)
 Biopsy, if tumour markers are negative

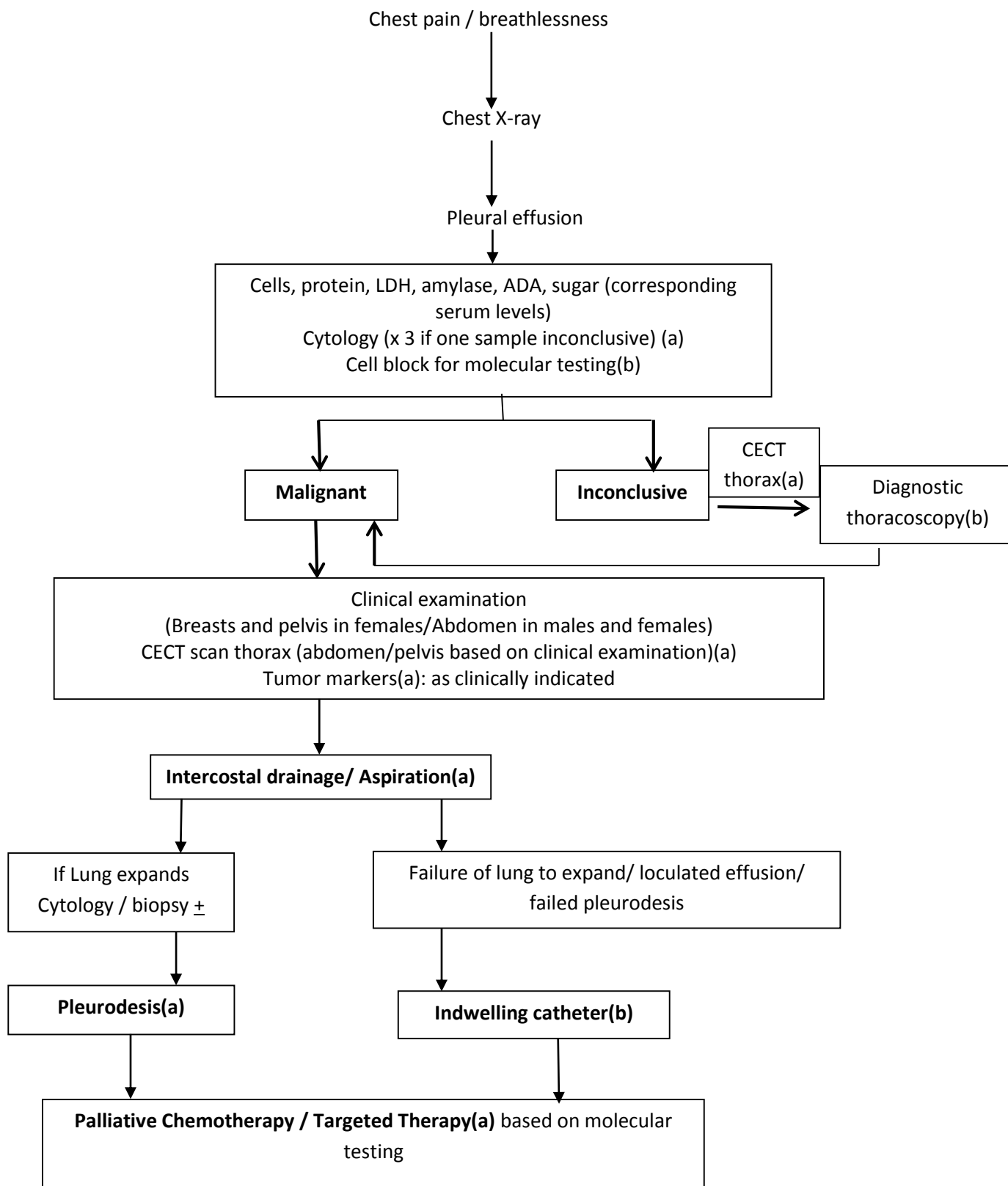


MANAGEMENT OF CHEST WALL TUMORS



<p>Chemotherapy for thymoma or thymic carcinoma :</p> <p>CAP: Cisplatin 50 mg/m² IV day 1, Doxorubicin 50 mg/m² IV day 1, Cyclophosphamide 500 mg/m² IV day 1 Administered every 3 weeks for 6 cycles</p> <p>CAP with prednisone: Cisplatin 30 mg/m² days 1–3, Doxorubicin, 20 mg/m²/d IV continuous infusion on days 1–3, Cyclophosphamide 500 mg/m² IV on day 1, Prednisone 100 mg/day days 1–5 Administered every 3 weeks for 6 cycles</p> <p>PE: Cisplatin 60 mg/m² IV day 1, Etoposide 120 mg/m²/d IV days 1–3 Administered every 3 weeks for 6 cycles</p> <p>ICE: Etoposide 75 mg/m² on days 1–4 Ifosfamide 1.2 g/m² on days 1–4 Cisplatin 20 mg/m² on days 1–4 Administered every 3 weeks for 6 cycles (b) Carboplatin/paclitaxel (preferred for thymic carcinoma) Carboplatin AUC 6, Paclitaxel 200 mg/m² Administered every 3 weeks for 6 cycles</p> <p>SECOND-LINE SYSTEMIC THERAPY</p> <p>Pemetrexed 500 mg /m² till progression or unacceptable toxicities Paclitaxel 80 mg /m² till progression or unacceptable toxicities Capecitabine (650 mg/mq twice daily on days 1-14) and intravenous gemcitabine (1000 mg/mq on days 1 and 8 every 3 weeks) for 6 cycles</p>
<p>Concurrent</p> <p>Cisplatin 25mg/m² day 1,2,3 and etoposide 75mg/m² day 1,2 ,3 every 4 weekly for 4 cycles</p>
<p>RT for thymoma</p> <p>Radical - 60-66Gy in 30-33 fractions over 6-7 weeks using conformal radiation therapy Adjuvant - 50-60Gy in 25-30 fractions to tumour bed over 5-6 weeks using conformal radiation therapy</p>
<p>RT for sarcomas</p> <p>Adjuvant - 50-60Gy in 25-30 fractions to tumour bed over 5-6 weeks using conformal radiation therapy</p>

MANAGEMENT OF PLEURAL EFFUSION

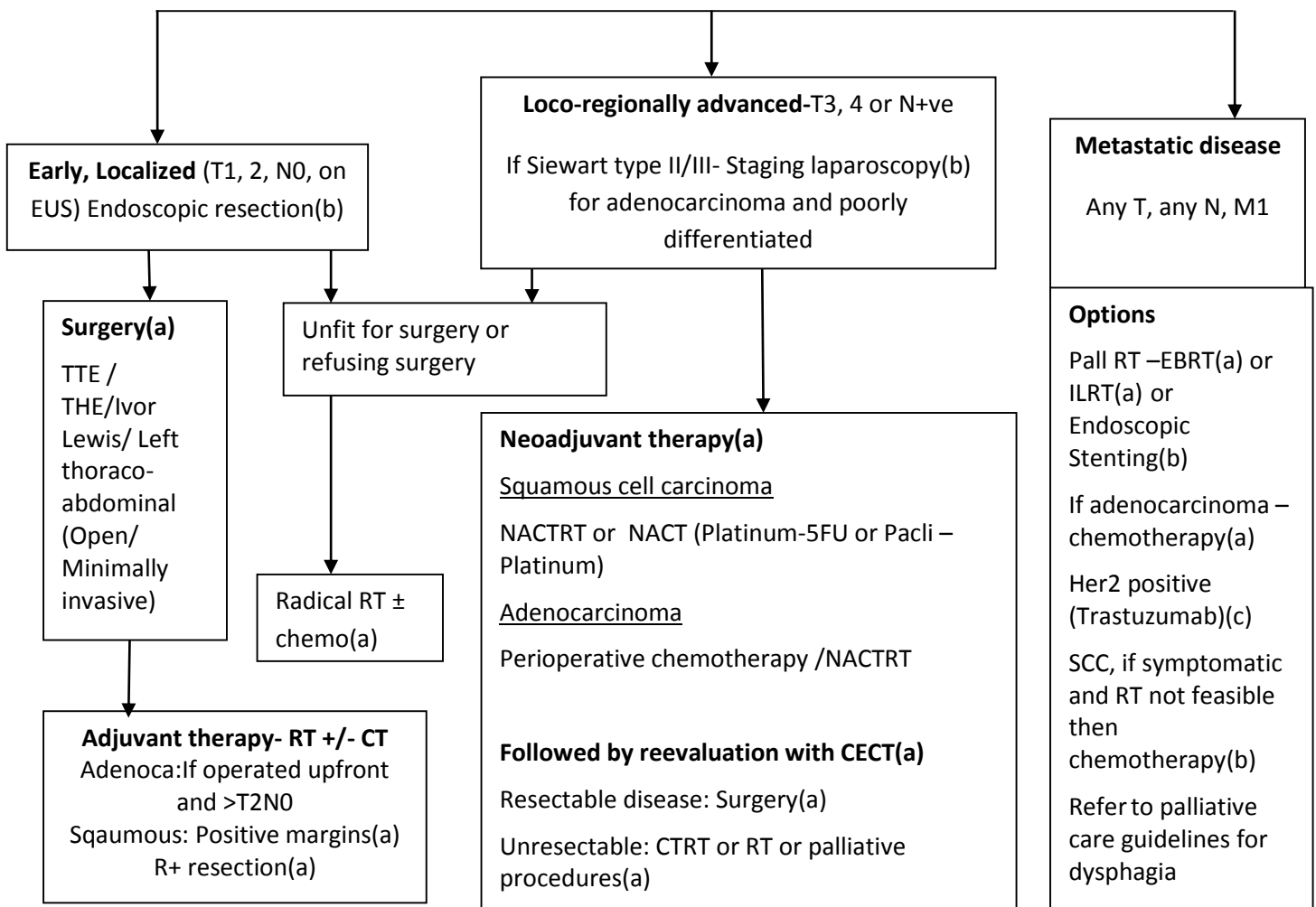


MANAGEMENT OF ESOPHAGEAL CANCER

CECT scan lower neck, thorax, abdomen (pelvis also for GE junction tumors)(a)
 Bronchoscopy (upper and middle third or H/o change in voice) (b)
 PET-CECT(b)

Optional Procedures- C

Endoscopic ultrasonography (EUS)(c) for borderline operable /early cases- T1, T2, N0



PROCEDURES IN ESOPHAGEAL CANCER

Surgery

Trans thoracic esophagectomy (TTE) - Open/ Minimally invasive
 Trans hiatal esophagectomy (THE) - Open/ Minimally invasive
 Ivor Lewis procedure - Open/ Minimally invasive
 Left thoraco-abdominal approach - Open/ Minimally invasive

Radiation therapy

Neo-adjuvant

41.4Gy in 23 fractions over 4-5 weeks: External Beam Image Guided radiotherapy (IGRT) with 3D CRT or IMRT using Linear Accelerator

Radical

50-60Gy in 25-30 fractions over 5-6 weeks: External Beam Image Guided radiotherapy (IGRT) with 3D CRT or IMRT using Linear Accelerator

Adjuvant

45-60 Gy in 25-30 fractions over 5-6 weeks: External Beam Image Guided radiotherapy (IGRT) with 3D CRT or IMRT using Linear Accelerator

Metastatic

20-30Gy in 5-10 fractions over 1-2 weeks: Palliative External Beam Radiotherapy
 Intra luminal brachytherapy: 4-6Gy – 1 to 3 sittings alone or in combination with external beam RT

Chemotherapy:

Concurrent:

Paclitaxel and carboplatin:

Paclitaxel 50 mg/m² IV on Day 1 Carboplatin AUC 2 IV on Day 1 Weekly for 5 weeks

Capecitabine and cisplatin:

Cisplatin 30 mg/m² IV on Day 1, Capecitabine 800 mg/m² PO BID on Days 1–5 Weekly for 5 weeks

Fluorouracil and oxaliplatin:

Oxaliplatin 85 mg/m² IV on Day 1, Leucovorin 400 mg/m² on Day 1, Fluorouracil 400 mg/m² IV Push on Day 1, Fluorouracil 800 mg/m² IV continuous infusion over 24 hours daily on Days 1 and 2, Cycled every 14 days for 3 cycles with radiation.

Paclitaxel 50 mg/m² IV on Day 1, Capecitabine 625–825 mg/m² PO BID on Days 1–5 Weekly for 5 weeks

Neo-Adjuvant chemotherapy: (For oesophageal and GEJ adenocarcinoma)

Fluorouracil, leucovorin, oxaliplatin, and docetaxel (FLOT):
(4 cycles preoperative and 4 cycles postoperative)

Fluorouracil 2600 mg/m² IV continuous infusion over 24 hours on Day 1

Leucovorin 200 mg/m² IV on Day 1

Oxaliplatin 85 mg/m² IV on Day 1

Docetaxel 50 mg/m² IV on Day 1

Cycled every 14 days

Capecitabine and Oxaliplatin:

Capecitabine 1000 mg/m² PO BID on Days 1–14 Oxaliplatin 130 mg/m² IV on Day 1

Cycled every 21 days (3 cycles preoperative and 3 cycles postoperative)

Fluorouracil and Oxaliplatin:

Oxaliplatin 85 mg/m² IV on Day 1

Leucovorin 200 mg/m² IV on Day 1

Fluorouracil 2600 mg/m² IV continuous infusion over 24 hours on Day 1

Cycled every 14 days (3 cycles preoperative and 3 cycles postoperative)

Taxane and cisplatin:

weekly Paclitaxel 80 mg/m² IV and carboplatin AUC 2 on Day 1 Given for 8 to 12 cycle. (For patients not fit for aggressive chemotherapy)

Neo-adjuvant chemotherapy for squamous cell carcinoma:

Taxane and cisplatin:

Paclitaxel 175 mg/m² IV and Cisplatin 75 mg/m² on Day 1 Given for 3 cycle.

Taxane and carboplatin:

Paclitaxel 175 mg/m² IV and carboplatin AUC 5 on Day 1 Given for 3 cycles (For patients not fit for cisplatin based chemotherapy)

Taxane and carboplatin:

Weekly Paclitaxel 80 mg/m² IV and carboplatin AUC 2 on Day 1 Given for 8 to 12 cycle. (For patients not fit for aggressive chemotherapy)

Cisplatin + Fluorouracil

Cisplatin 75 mg/m² IV on Day 1 Fluorouracil 1000 mg/m² IV continuous infusion over 24 hours daily on Days 1–5 every 3 weekly for 3 cycles

SYSTEMIC THERAPY FOR METASTATIC OR LOCALLY ADVANCED CANCER NOT AMENABLE FOR LOCAL THERAPY:

Capecitabine and Oxaliplatin:

Capecitabine 1000 mg/m² PO BID on Days 1–14 Oxaliplatin 130 mg/m² IV on Day 1 Cycled every 21 days

Fluoropyrimidine and oxaliplatin:

Oxaliplatin 85 mg/m² IV on Day 1

Leucovorin 400 mg/m² IV on Day 1

Fluorouracil 400 mg/m² IV Push on Day 1 Fluorouracil 1200 mg/m² IV continuous infusion over 24 hours daily on Days 1 and 2 with Trastuzumab 8 mg/kg IV loading dose on Day 1 of cycle 1,

Cisplatin + Fluorouracil:

Cisplatin 75–100 mg/m² IV on Day 1

Fluorouracil 750–1000 mg/m² IV continuous infusion over 24 hours daily on Days 1–4 cycle every 4 weekly

Cisplatin + Capecitabine:

Cisplatin 80 mg/m² IV daily on Day 1 Capecitabine 1000 mg/m² PO BID on Days 1–14 Cycled every 21 days

In case of her 2 amplified disease add Trastuzumab 8 mg/kg IV loading dose on Day 1 of cycle 1, then Trastuzumab 6 mg/kg IV every 21 days to any of the above regimen till disease progression or unacceptable toxicities

Taxane and cisplatin:

Paclitaxel 175 mg/m² IV and Cisplatin 75 mg/m² on Day 1 Given for 6 cycle.

Taxane and carboplatin:

Paclitaxel 175 mg/m² IV and carboplatin AUC 5 on Day 1 Given for 6 cycles (For patients not fit for cisplatin based chemotherapy)

Taxane and carboplatin:

Weekly Paclitaxel 80 mg/m² IV and carboplatin AUC 2. (For patients not fit for aggressive chemotherapy)

Cisplatin + Fluorouracil:

Cisplatin 75 mg/m² IV on Day 1 Fluorouracil 1000 mg/m² IV continuous infusion over 24 hours daily on Days 1–5 every 3 weeks for 6 cycles

Irinotecan:

Irinotecan 250–350 mg/m² IV on Day 1 Cycled every 21 days

Irinotecan 150–180 mg/m² IV on Day 1 Cycled every 14 days

Irinotecan 125 mg/m² IV on Days 1 and 8 Cycled every 21 days

Irinotecan and cisplatin:

Irinotecan 65 mg/m² IV on Days 1 and 8 Cisplatin 25–30 mg/m² IV on Days 1 and 8 Cycled every 21 days

Weekly Paclitaxel:

Paclitaxel 80 mg/m² weekly till disease progression or unacceptable toxicities

* Cisplatin ineligibility:

(1) ECOG performance status of 2 and/or (2) creatinine-clearance < 60 ml/min and/or (3) CTCAE Gr ≥ 2 hearing loss and/or (4) CTCAE Gr ≥ 2 neuropathy.

ABBREVIATIONS

AFP	Alpha fetoprotein
ALK	Anaplastic Lymphoma kinase
B-HCG	Beta-Human chorionic-gonadotrophin
CBC	Complete blood count
CECT	Contrast enhanced computed tomography
CT	Chemotherapy
CTRT	Chemoradiation
EBUS	Endobronchial ultrasonography
EGFR	Epidermal growth factor receptor
EUS	Endoscopic ultrasound
EPP	Extra-pleural pneumonectomy
LDH	Lactate dehydrogenase
LFT	Liver function test
ILRT	Intraluminal radiation therapy
NACT	Neoadjuvant chemotherapy
NACTRT	Neoadjuvant chemoradiation therapy
NGS	Next-Generation Sequencing
NSGCT	Non-seminomatous germ cell tumour
PDL1	Programmed death-ligand 1
PET-CT	Positron emission tomography - Computed tomography
PNET	Primitive neuro-ectodermal tumour
PORT	Post-operative radiation therapy
RFT	Renal function test
RT	Radiation therapy
SBRT	Stereotactic body radiation therapy
SMLND	Systematic mediastinal lymph node dissection
SRS	Stereotactic radiosurgery

ANNEXURE -1. RADIOLOGY SYNOPTIC REPORTING FORMATS

LUNG CANCER- CT SCAN

PROTOCOL :

Patient Instructions :

- 4 hours fasting, but water intake is encouraged prior to the scan.
- Patient is asked to void 30 minutes prior to the scan.
- Serum Creatinine to be in check, ideally <1.2 mg/dl, above which, the eGFR is calculated. Contrast enhanced scan can be performed for eGFR>30mL/min.
- **Contrast Agent :**
- Intravenous : At the time of scan, approximately 80 to 120 ml of non-ionic contrast is injected at the rate of 2 ml/sec. Iso-osmolar contrast agent used if eGFR is on the lower side.
- **Scan area :** supraclavicular fossa to upper abdomen.
- Section thickness : 5mm. Isotropic multiplanar post processing reconstruction at 1 mm interval.

Lung Cancer Staging CT Scan:

CT SCAN OF CHEST AND ABDOMEN

Contrast Enhanced CT scan performed on a 16 slice MDCT.

Indication:

Primary -
-Size
-Involved lobe
-Any other lobe involved
-Vessel / bronchus infiltration
-Involvement of pleura, mediastinal structures.
-Involvement of ribs and pleura.
-Proximity to bronchus and carina.

Lymph node- Hilar, mediastinal N2/N3, Supraclavicular.
Non regional adenopathy- axillary, retroperitoneal, internal mammary.
Node characteristics- Size, round/oval, necrosis, calcification, perinodal fat stranding, fatty hilum, enhancement patterns.

Metastatic disease - Lung, liver, adrenal, skeletal.
Any ground glass opacity like nodules

Other info required -

- Condition of the lung - COPD, Emphysema, Infective changes, ILD
- Anomalous vessel or bronchi
- Any other anomaly / infiltration in the chest wall.
 - Cardiac size, chamber enlargement, any thrombus, any cardiac chamber or pulmonary arteries.

In case of large lesions - infiltration of mediastinal structures/ chest wall

In case of small lesions - Info which will help in deciding segmental resection like segmental vessel, bronchial involvement

MEDIASTINAL TUMORS

PROTOCOL :

Patient Instructions :

- 4 hours fasting, but water intake is encouraged prior to the scan.
- Patient is asked to void 30 minutes prior to the scan.
- Serum Creatinine to be in check, ideally <1.2 mg/dl, above which, the eGFR is calculated. Contrast enhanced scan can be performed for eGFR>30mL/min.

- **Contrast Agent :**
- Intravenous : At the time of scan, approximately 80 to 120 ml of non-ionic contrast is injected at the rate of 2 ml/sec. Iso-osmolar contrast agent used if eGFR is on the lower side.
- **Scan area :** supraclavicular fossa to upper abdomen.
- Section thickness : 5mm. Isotropic multiplanar post processing reconstruction at 1 mm interval.

Mediastinal Tumors Staging CT Scan:

CT SCAN OF CHEST AND ABDOMEN

Contrast Enhanced CT scan performed on a 16 slice MDCT.

Indication:

Primary Lesion-

- Location- Anterior, middle and posterior mediastinum.
- Size
- Lesion characteristics- Fluid / calcification / fatty areas / enhancement patterns

/ necrosis

- Vessel / bronchus infiltration
- Involvement of pleura, mediastinal structures.
- Cardiac involvement
- Nerve involvement - phrenic nerve palsy
- Vertebral foramina/ intradural extension

Lymph node- Hilar, mediastinal, Supraclavicular.
Axillary, retroperitoneal, internal mammary.
Node characteristics- Size, round/oval, necrosis, calcification, perinodal fat stranding, fatty hilum, enhancement patterns.

Metastatic disease - Lung, liver, adrenal, skeletal and pleural.

Other info required -

- Condition of the lung - COPD, Emphysema, Infective changes, ILD
- Anomalous vessel or bronchi
- Any other anomaly / infiltration in the chest wall.
- Cardiac size, chamber enlargement, any thrombus, any cardiac chamber or pulmonary arteries.

CT SCAN OF THORAX

Plain/ post contrast CT scan of thorax has been performed.

Indication: To look for infective focus.

Comparison:

Findings:

Lungs:

Consolidation- Absent/ Lobar/ segmental / sub segmental

Nodules- Absent / Discrete/ tree in bud / nodules with surrounding ground glass

Patchy ground glass density- Present /Absent: if present distribution.

Septal thickening- Present / Absent, distribution

Pleura:

Heart and great vessels:

Mediastinal nodes:

Chest wall:

Visualized abdomen:

Liver: hepatomegaly – present / absent
fatty infiltrations - present /absent
focal lesion – present / absent; description if present

Spleen: enlarged- yes/ no, if yes size
Focal lesion- present / absent; description if present

Visualized Bones:

Impression:

ANNEXURE -2. PATHOLOGY SYNOPTIC REPORTING FORMATS

MESOTHELIOMA

1. PATIENT DEMOGRAPHICS

Name Age/Sex..... Case no Path No.....
Date & Time of receipt Date & Time of Grossing..... Grossed by.....
Referring Consultant.....

2. MACROSCOPIC FEATURES

a. **Specimen Type/ Operative Procedure:** Extrapleural pneumonectomy/Extended pleurectomy/ Partial pleurectomy /decortication/ Core biopsy / Open biopsy/ VATS biopsy/ Other (specify)

b. **Specimen Laterality:** Right Left Not specified

c. **Tumor Site:** Parietal pleura / Visceral pleura /Diaphragm /Other (specify)

d. **Dimensions:**

1. Greatest dimension __cm,
2. Additional dimensions __x__cm
3. Cannot be determined (explain): _____

e. **Tumor Focality:** Localised Diffuse Cannot be determined

f. **Macroscopic Status of involvement of the chest wall/ other structures by tumour:**
Involved not involved Not assessable

g. **Resection margins:** Distance of Closest pleural/soft tissue/ rib cut margin.....

BLOCK IDENTIFICATION: Tumour (.....), Underlying lung(.....), Adjacent structure(.....)
Resection margins (.....)Lymph nodes(.....)

3. MICROSCOPIC FEATURES

a) **Histological tumour type**

- a. Epithelioid mesothelioma(specify subtype)
 - solid, tubulopapillary, and trabecular, micropapillary, adenomatoid (microcystic), clear cell, transitional, deciduoid, small cell and pleomorphic
- b. Sarcomatoid mesothelioma
- c. Biphasic mesothelioma
- d. Desmoplastic mesothelioma

b) Histologic Grade

- G1: Well differentiated
- G2: Moderately differentiated
- G3: Poorly differentiated, undifferentiated
- GX: Cannot be assessed

c) Local invasion

- Tumor limited to parietal pleura without/ with involvement of ipsilateral visceral, mediastinal, diaphragmatic pleura
- Tumor involves diaphragmatic muscle
- Tumor extends into lung parenchyma
- Tumor involves endothoracic fascia/ into mediastinal fat
- Solitary focus / Diffuse or multiple foci extends into the soft tissues of the chest wall
- Tumor extends into but not through the pericardium
- Tumor involves rib(s)
- Tumor involves mediastinal organ(s) (specify): _____
- Other (specify): _____

d) Resection Margins

Cannot be assessed

___ Uninvolved by mesothelioma

___ Involved by mesothelioma

e. Response to neoadjuvant therapy

Less than/ equal to 50% residual viable tumour More than 50% residual viable tumour Treatment history not known Not applicable

f. Regional Lymph Nodes

- No lymph nodes submitted or found
- Lymph Node Examination (required only if lymph nodes are present in the specimen)
 - Number of Lymph Nodes Involved: _____
 - Number of Lymph Nodes Examined: _____

4. ADDITIONAL PATHOLOGIC FINDINGS

- None identified
- Inflammation (specify type)
- Asbestos bodies
- Pleural plaque
- Pulmonary interstitial fibrosis Other (specify): _____
- Other (specify): _____

7. ANCILLARY STUDIES

Immunohistochemistry for subtyping: Performed Not Performed

- The 2015 WHO recommends the combined use of a minimum of 2 mesothelial markers and 2 carcinoma markers for establishing the diagnosis
- If performed, record positive, negative and equivocal markers, interpretation and conclusions

7. IMPRESSION

- **Histologic type**
- **Pathology stage (8th AJCC staging system):**pTpNpM (if known)
- **Complete resection at all margins** Yes (R0) No (R1 R2)

Date of Reporting..... Consultant.....

RESECTIONS OF OESOPHAGEAL TUMOURS

1. PATIENT DEMOGRAPHICS

Name Age/Sex..... Case no Path No.....
Date & Time of receipt Date & Time of Grossing..... Grossed by.....
Referring Consultant.....

2. MACROSCOPIC FEATURES

- a. **Specimen Type:** Partial esophagectomy/Total esophagectomy/ Esophagogastrectomy
- b. **Length of specimen:** Along oesophagus (.....cm), Along lesser curvature of stomach(.....cms), Along greater curvature of stomach(.....cms)
- c. **Tumor identified:** Yes/ No/ Uncertain [If “No” or “Uncertain”, please specify
- d. **Tumor/Lesion location:** Gastro-oesophageal junction/Lower third/Middle third/Upper third oesophagus
- e. **Relationship of Tumor to Gastro-Oesophageal Junction(GEJ) :** Distance of tumor epicentre from esophagogastric junction cms and specify:
 - Tumor is entirely located within the tubular oesophagus and does not involve the GEJ

- Tumor epicentre lies in the distal oesophagus *and* tumor involves the GEJ
- Tumor epicentre is 2 cm or less into proximal stomach or cardia and tumor involves GEJ
- Tumor epicentre is 2 cm or less into proximal stomach or cardia and tumor does not involve GEJ
- Cannot be assessed

f. **Tumor size:** Greatest dimension in length (centimeters): ___ cm
 Additional dimensions (centimeters): ___ x ___ cm
 Cannot be determined (explain): _____

g. **Tumor gross appearance:** Exophytic/Polypoidal/Ulceroproliferative/Ulceroinfiltrative/Constrictive

h. **Tumor invasion:** Mucosa/Submucosa/Muscularis propria/Adventitia

i. **Resection margins**

Margin type	Involvement by tumor		Distance from tumor (cm)
Proximal	Yes	No	
Distal	Yes	No	
Circumferential(CRM)	Yes	No	

j. **Adjacent oesophagus:** Polyps/ Ulcers/ Salmon pink Patch/Unremarkable

Lymph nodes

Site of node		Node/FFT	No. of nodes	Size of largest node (cm)
Dissected from specimen	Along the oesophagus	Node/FFT		
	At G-E junction	Node/FFT		
	Along lesser curve	Node/FFT		
	Along greater curve	Node/FFT		
Separately sent	Sampled separately as per station labelled	Node/FFT		

BLOCK IDENTIFICATION: Tumour (.....), Resection margins[Proximal, Distal & CRM (.....)], GE Junction(.....), Adjacent Oesophagus/ stomach (.....)Lymph nodes(.....)

3. MICROSCOPIC FEATURES

a) **Histological type**

- Squamous carcinoma Adenocarcinoma Adenosquamous carcinoma
 Undifferentiated carcinoma Small cell neuroendocrine carcinoma
 Large cell neuroendocrine carcinoma Sarcomatoid carcinoma Others, specify

b) Histologic Grade

- G1: Well differentiated
- G2: Moderately differentiated
- G3: Poorly differentiated, undifferentiated
- GX: Cannot be assessed

c) Tumor Extension

- No evidence of primary tumor(pT0)
- High-grade dysplasia/carcinoma in situ, defined as malignant cells confined to the epithelium by the basement membrane(pTis)
- Tumor invades the lamina propria/ muscularis mucosae (pT1a)
- Tumor invades the submucosa(pT1b)
- Tumor invades the muscularis propria(pT2)
- Tumor invades adventitia(pT3)
- Tumor invades adjacent structures/organs ((pT4a/b)
- Tumor Cannot be assessed(pTx)

d) Lymphovascular/ Perineural invasion

Present Absent Cannot be assessed

e) Margins

Excision complete (R0) Yes No Cannot be assessed

If excision not complete:

Microscopic involvement (R1) Yes No

Macroscopic involvement (R2) Yes No

Margin type	Involved by invasive carcinoma, dysplasia, and intestinal metaplasia		Distance from tumor (mm/cm)
Proximal	Yes	No	
Distal	Yes	No	
Circumferential(CRM)*	Yes	No	

*Circumferential margin to be evaluated at level of highest penetration by tumour & considered to be involved if < 1mm away from inked margin

f) Response to neo-adjuvant therapy (3/5-tiered TRG system.....To specify which system is being used)

- Tumour regression grade (TRG) should be recorded using either **Mandard(5 Tier system)** or **Modified Ryan Scheme(3 Tier System)**

g) Lymph node involvement

- Total Number of Lymph Nodes Examined (Both from Main resection specimen & Separately labelled specimen(s): _____
- Number of Lymph Nodes Involved: _____

- pN0: No regional lymph node metastasis
- pN1: Metastasis in one or two regional lymph nodes
- pN2: Metastasis in three to six regional lymph nodes
- pN3: Metastasis in seven or more regional lymph nodes

4. ADDITIONAL PATHOLOGIC FINDINGS

- None identified
- Intestinal metaplasia (Barrett's esophagus)
- Low-grade/ High-grade squamous dysplasia
- Low-grade/ High-grade glandular dysplasia
- Esophagitis (type): _____
- Gastritis (type): _____
- Other (specify): _____

5. ANCILLARY STUDIES

Immunohistochemical markers : Performed Not Performed

If performed, record positive, negative and equivocal markers, interpretation and conclusions

6. IMPRESSION

- **Histologic type**
 - **Pathology stage (8th AJCC staging system): p/ypTNM**
 - **Complete resection at all margins** Yes (R0) No (R1 R2)
-

Date of Reporting..... Consultant.....

RESECTIONS OF LUNG TUMOURS

1. PATIENT DEMOGRAPHICS

Name Age/Sex..... Case no Path No.....

Date & Time of receipt Date & Time of Grossing..... Grossed by.....

Referring Consultant.....

2. MACROSCOPIC FEATURES

a. **Specimen Type:** Wedge resection/ Segmentectomy/ Bilobectomy/ Sleeve lobectomy/
Lobectomy/Pneumonectomy/ Major airway resection (specify)/Other (specify)

b. **Specimen Laterality:** Right Left Not specified

c. **Tumor Site:** Upper lobe/ Middle lobe/Lower lobe of lung/Bronchus,(specify)

d. **Dimensions:**

Specimen size __x__x__cm,

Tumour size __x__x__cm

Tumour size cannot be determined

Length of bronchial resection (stump):cms, Not applicable

✓ (pT1a ≤10 mm; pT1b 11–20 mm; pT1c 21–30 mm; pT2a 31–40 mm; pT2b 41–50 mm; pT3 >50–70 mm; pT4 >70 mm),

✓ If multiple tumours, assignment of the T category is based on the size of the largest tumour

e. **Tumor Focality:**

Single Tumour

Multiple tumor nodules

✓ If present, record the number of tumours, size, location and distance from the primary tumor

f. **Macroscopic Status of pleura overlying tumour:**

Involved

not involved

Not assessable

g. **Macroscopic Status of chest wall structures overlying tumour:**

Involved

not involved

Not assessable

h. **Main bronchus involvement by the tumour & its distance from Carina(</>2cms) :**

Involved

Not identified

Not assessable

i. **Resection margins**

Margin type	Involvement by tumor		Distance from tumor (cm)
	Yes	No	
Bronchial	Yes	No	
Vascular	Yes	No	
Parenchymal	Yes	No	

j. **Adjacent lung:** Unremarkable/ shows atelectasis/ Separate tumour

nodules/Bullae/Abscess /Cavitatory lesion / other

➤ **Atelectasis/obstructive pneumonitis extending to the hilar region:**

Absent

Present

Not assessable

If present, specify, Patchy or Diffuse & to be correlated with the radiological findings

k. Lymph nodes

Site of node		Node/FFT	No. of nodes	Size of largest node (cm)
Dissected from specimen	Along the Hilum	Node/FFT		
Separately sent	Sampled separately as per Lymph node Station(IASLC Node Atlas)	Node/FFT		

BLOCK IDENTIFICATION: Tumour (.....), Resection margins (.....), Pleura (.....), Adjacent lung (.....) Lymph nodes(.....)

3. MICROSCOPIC FEATURES

a) Histological tumour type

- Squamous carcinoma Adenocarcinoma Adenosquamous carcinoma Small cell carcinoma Large cell neuroendocrine carcinoma
 Typical carcinoid tumor Atypical carcinoid tumor
 Combined neuroendocrine carcinoma Large cell carcinoma
 Pleomorphic carcinoma Sarcomatoid carcinoma Giant cell carcinoma
 NUT carcinoma Mucoepidermoid carcinoma Adenoid cystic carcinoma
 Non-small cell carcinoma, NOS Others, specify

b) Classification of adenocarcinoma

- Invasive Adenocarcinoma:

(If yes: predominant pattern [as percentages to total of 100% in 5% increments]):

Lepidic Acinar Papillary Micropapillary Solid

Mucinous Non-mucinous Mixed mucinous/non-mucinous (>10% of each)

Invasive mucinous adenocarcinoma Adenocarcinoma in situ(Mucinous/ Non Mucinous) Minimally invasive adenocarcinoma (invasive component less than 5 mm)

Variants of adenocarcinoma (If yes: Colloid Fetal Enteric

c) Histologic Grade

- G1: Well differentiated
 ➤ G2: Moderately differentiated
 ➤ G3: Poorly differentiated, undifferentiated
 ➤ GX: Cannot be assessed

d) Spread Through Air Space (STAS):

Absent Present

e) Lymphovascular/ Perineural invasion

Present Absent Cannot be assessed

f) Local invasion

➤ Pleural invasion Yes No Cannot be assessed

Extent of pleural invasion

- Visceral pleura only (pT2)
- Parietal pleura/chest wall (pT3)

➤ Pericardium (pT3) Yes No Cannot be assessed

➤ Mediastinum (pT4) Yes No Cannot be assessed

➤ Diaphragm (pT4) Yes No Cannot be assessed

➤ Great vessel (T4) Yes No Cannot be assessed

➤ Atrium, heart (pT4) Yes No Cannot be assessed

➤ Malignant pleural effusion (pM1a) Yes No Cannot be assessed

g) Separate tumour nodules

Absent Present Cannot be assessed

Synchronous primary tumours Absent Present

Satellite nodules (intrapulmonary metastases)

Satellite tumour nodules in same lobe (pT3)

Satellite tumour nodules in different ipsilateral lobe (pT4)

Satellite tumour nodules in contralateral lobe (pM1a)

h) Resection Margins

Margin type	Involved by invasive carcinoma, dysplasia, Squamous carcinoma in situ/ Adenocarcinoma in situ/ only peribronchial soft tissue involved,		Distance from tumor (mm/cm)
Bronchial	Yes	No	
Vascular	Yes	No	
Parenchymal	Yes	No	
Chest wall	Yes	No	

Excision complete (R0) Yes No Cannot be assessed

If excision not complete:

Microscopic involvement (R1) Yes No

Macroscopic involvement (R2) Yes No

i. Response to neoadjuvant therapy

Less than/ equal to 10% residual viable tumour More than 10% residual viable tumour Treatment history not known Not applicable

j. Lymph node involvement

Ipsilateral hilar/intrapulmonary (node stations 10–14)	Submitted <input type="checkbox"/>	Involved (N1) <input type="checkbox"/>
	Not submitted <input type="checkbox"/>	Not involved <input type="checkbox"/>
Ipsilateral mediastinal (node stations 1–9)	Submitted <input type="checkbox"/>	Involved (N2) <input type="checkbox"/>
	Not submitted <input type="checkbox"/>	Not involved <input type="checkbox"/>
Contralateral mediastinal, hilar nodes	Submitted <input type="checkbox"/>	Involved (N3) <input type="checkbox"/>
	Not submitted <input type="checkbox"/>	Not involved <input type="checkbox"/>
Ipsilateral or contralateral scalene or supraclavicular nodes	Submitted <input type="checkbox"/>	Involved (N3) <input type="checkbox"/>
	Not submitted <input type="checkbox"/>	Not involved <input type="checkbox"/>

If involved, record Number of lymph nodes examined & Number of positive lymph nodes for each

Station (Involved (No.+__/_Total)

Granulomatous inflammation involving lymph nodes (as per nodal station)

Present Absent Not assessable

4. ADDITIONAL PATHOLOGIC FINDINGS

- None identified
- Other neoplastic precursor lesions (eg tumourlets, NEH, AAH, dysplasia, carcinoma in situ)
- Non-neoplastic lung disease [Inflammation (specify type): if any], Fibrosis (identify if discernable pattern), Emphysema]
- Other (specify): _____

5. ANCILLARY STUDIES

a. Immunohistochemistry for subtyping: Performed Not Performed

If performed, record positive, negative and equivocal markers, interpretation and conclusions

b. Molecular data (Record the methods used)

Epidermal growth factor mutation present Yes No Not assessed

ALK translocation present Yes No Not assessed

b) Extent of Direct invasion

Capsular invasion(pT1a)	No invasion beyond capsule or limited to mediastinal fat	Invasion beyond the mediastinal fat	Not assessable	Not applicable
Mediastinal pleura(pT1b)	Not involved	Involved	Not assessable	Not applicable
Pericardium(pT2)	Not involved	Involved	Not assessable	Not applicable
Lung/Visceral pleura(pT3)	Not involved	Involved	Not assessable	Not applicable
Phrenic nerve(pT3)	Not involved	Involved	Not assessable	Not applicable
Chest wall(pT3)	Not involved	Involved	Not assessable	Not applicable
Great vessels (pT3)-Innominate vein, SVC (pT4) –Aorta, Arch vessels, intrapericardial pulmonary artery	Not involved	Involved	Not assessable	Not applicable
Other involved organ sites-(pT4) Myocardium, Oesophagus, Trachea)	Not involved	Involved	Not assessable	Not applicable

c) Lymphovascular/ Perineural invasion

Present Absent Cannot be assessed

d) Separate extra-thymic tumour nodules/metastases

➤ **Pleural or pericardial (stage pM1a)**

Present Not identified

If present, specify: Number: Location(s)

➤ **Other nodules (stage pM1b)**

Lung, intra-parenchymal Present Not identified

Distant organ Present Not identified

If present, specify: Number: Location(s)

e) Margins

Excision complete (R0) Yes No Cannot be assessed

If excision not complete:

Microscopic involvement (R1) Yes No

Macroscopic involvement (R2) Yes No

Sites of involvement if R1 or R2:

Closest margin if excision complete: distancemm

f) Lymph node involvement

Anterior (peri-thymic){N1}:	Not involved	Involved	Not assessable	Not applicable
Deep intrathoracic/cervical[N2]:	Not involved	Involved	Not assessable	Not applicable
Other Location/s outside N 1 or 2 (M1b disease):	Not involved	Involved	Not assessable	Not applicable

If involved, record Number of lymph nodes examined & Number of positive lymph nodes for each

location type (Involved (No.+ __/ __ Total)

g) Response to neoadjuvant therapy (3-tiered TRG system)

N/A Complete/Near complete Partial None/Minimal

5. COEXISTENT PATHOLOGY

-Thymic hyperplasia (Follicular/Epithelial/ True type) – In Thymectomy specimens from myasthenia gravis patients

- Cystic changes(In tumour/ In adjacent thymus)
- Other (specify)

6. ANCILLARY STUDIES

a. Immunohistochemical markers : Performed Not Performed

If performed, record positive, negative and equivocal markers , interpretation and conclusions

b. Molecular studies: If performed, record specific tests and results

7. OTHER(S)

8. IMPRESSION

- **Histologic type**
 - **8th TNM Staging as per ITMIG recommendations): pT... pN...pM...**
 - **Modified Masoka Staging.....**
 - **Complete resection at all margins** Yes (R0) No (R1 R2)
-

Date of Reporting..... Consultant.....