# NEET SS ANAESTHESIA
# ANESTHESIA
# PRACTICAL

CONTENT

# MULTINODULAR GOITRE PATIENT FOR TOTAL THYROIDECTOMY

## Case scenario

00:00:21

**Chief complaints :**

A 48 year old female came with chief complaints of swelling in front of the neck for 5 years.

**Patient history :**

History of present illness :

- Apparently normal 5 years back.
- Noticed small swelling.
- Gradually increased in size.
- 3 Years back developed :
  - Weight gain, increased fatigue, menstrual irregularities, hair loss, increased sleepiness, constipation.
  - Found to have some thyroid hormonal problem & started on treatment.
  - One tablet everyday morning in empty stomach.
- Discontinued treatment 2 years back.
- Now difficulty in taking solid food & breathing difficulty in supine position.
- No history of weight loss, no change in voice.
- No strider, neck pain, rapid increase in size of swelling, hemoptysis.
- H/o snoring +, no OSA.
- No loss of consciousness, hospital/ICU admission for same.
- No palpitation, breathlessness and pedal edema.
- Patient is having constipation for which she is taking some drug.

Past medical & surgical history :

- H/o Hypercholesterolemia (On treatment).
- H/o D & C 1 year back, because of bleeding PV.
- No history of thyroid surgery.
- No other surgeries in the past.
- H/o thyroid hormone problem for which she took treatment for 1 year and stopped.

Treatment history :

- History suggestive of hypothyroidism was on treatment for 1 year.
- Stopped treatment as the symptoms improved.
- Taking treatment for hypercholesterolemia regularly.
- Not on any other drugs.
- No drug allergies.

Family history :

- married and having 2 children/middle class family.
- No h/o similar illness in the family.
- No history of any malignancy in the family.

Personal history :

H/o constipation.

No bladder problems/no sleep problems.

No addictions.

Importance of history :

- Duration of swelling.
- Progress/risk factors for thyroid disease.
- Features of compression/retrosternal extension.
- Features of malignancy/metastasis.
- Features of hyper/hypothyroidism.

**Clinical features :**

| Hyperthyroidism | Hypothyroidism |
|---|---|
| • Insomnia<br>• Nervousness<br>• Tremor<br>• Heat intolerance<br>• Diffuse thyroid swelling<br>• Hypertension with wide PP<br>• Thyrotoxic cardiomyopathy<br>• Tachycardia<br>• High output cardiac failure<br>• Arrhythmias/MI<br>• Hypercarbia due to increased BMR | • Increased sleepiness<br>• Lethargic/slow mental functions<br>• muscle cramps<br>• Cold intolerance<br>• Hypotension with narrow pulse pressure<br>• Amyloid cardiomyopathy<br>• Bradycardia<br>• Low stroke volume & CO<br>• Bradyarrhythmia/MI<br>• ↓ ventilatory response to $CO_2$ |

| Hyperthyroidism | Hypothyroidism |
|---|---|
| • Reduced VC due to muscle weakness<br>• DOE<br>• Diarrhoea<br>• Increased appetite<br>• Weigh loss<br>• Amenorrhoea/oligomenorrhea<br>• Infertility/abortion<br>• Pretibial myxoedema<br>• Warm moist skin<br>• Palmar erythema<br>• Proximal myopathy<br>• Thyroid acropatchy (Clubbing)<br>• Exaggerated tendon reflexes | • OSA/pleural effusion/hoarseness of voice<br>• Constipation<br>• Reduced appetite<br>• Weight gain<br>• Menorrhagia<br>• Myxoedema<br>• Cool, dry skin & hair<br>• Carpel tunnel syndrome<br>• Mottled skin due to vasoconstriction<br>• Anemia/hypercholestrolemia<br>• Reduced tendon reflexes |

Family history :

- Nutritional cause.
- Part of malignancy.
- MEN 2A :
  - Medullary carcinoma thyroid.
  - Pheochromocytoma.
  - Parathyroid adenomas.
- MEN 2B :
  - Medullary carcinoma thyroid.
  - Pheochromocytoma.
  - Neuromas.

**Examination of patient :**

General examination :

- Weight : 72 kg.
- Height : 160 cm.
- Bmi : 28.125
- Conscious, oriented.
- Pale, cold & dry skin, madarosis (+), eyes normal.
- No clubbing.
- Non pitting bilateral pedal edema (+).
- Thyroid swelling (+).

- No cyanosis/generalised lymphadenopathy/afebrile.
- PR : 62/min regular.
- BP : 100/70 mmhg.

Airway examination :

- Short neck.
- Thyroid swelling ++.
- Tracheal deviation to left.
- Mouth opening : 5 cm.
- TMD : 6 cm.
- Hyo-mental distance : 4 cm.
- TMJ : 1 finger.
- Mallampatti class 3.
- Neck movements full.

Local examination :

- Inspection :
  - Swelling of 10 x 8 cm located in front more towards left.
  - Moving with deglutition.
  - Surface irregular/no dilated veins, scars or sinuses.
  - Lower border seen.
  - Pemberton sign negative.
- Palpation :
  - No local rise in temperature/tenderness.
  - Tracheal shift to right.
  - Surface irregular, firm to hard with multiple nodules palpable.
  - Lower border palpable.

Percussion : Resonant note on manubrium sterni.

Auscultation :

- No bruit over swelling/no carotid brui.
- No stridor.

Systemic examination :

- CVS.
- RS.
- CNS.
- GIT.
- Spine.

Eye signs in hyperthyroidism :

- von Graefe's sign : Lid lag on looking downwards.
- Joffroy's sign : Absence of wrinkling in the forehead.
- Stellwag's sign : Staring look with infrequent blinking.
- Moebiu's sign : Failure to converge eyeballs.
- Dalrymple's sign : Upper sclera visible without retraction of the upper lid.

Examination :

- Pizzillo's method for inspection.
- Pemberton's sign.
- Nafziger's method to examine for proptosis.
- Kocher's method from behind.
- Lahey's method.
- Criles method.

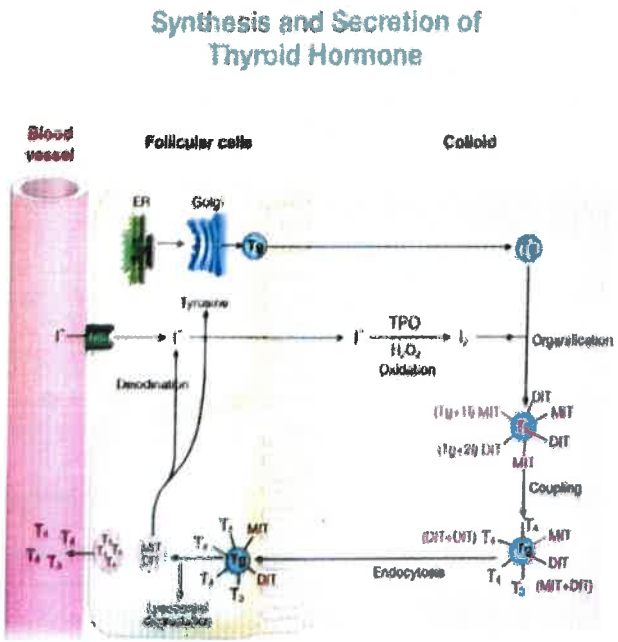
**Summary/diagnosis :**

48 year old lady with a history of neck swelling for the last 5 years with a slow increase in size with features of hypothyroidism with no features suggestive of retrosternal extension/compression on examination found to have a firm irregular thyroid swelling without retrosternal or compression.

## Questions

00:24:30

**Thyroid hormone is synthesis :**



## Causes of hyperthyroidism & hypothyroidism :

### Causes of hyperthyroidism :

- Overfunction of the thyroid
  - Graves disease.
  - Toxic adenoma.
  - Toxic multinodular goiter odine-induced hyperthyroidism.
  - TSH-mediated hyperthyroidism (TSH producing pituitary adenoma).
  - Trophoblastic disease and germ cell tumors.
- Destructive thyroid diseases (Thyroiditises)
  - Subacute thyroiditis.
  - Hashimoto thyroiditis.
  - Silent thyroiditis.
  - Post-partum thyroiditis.
  - Iodine-induced thyroiditis.
- Ectopic hyperthyroidism
  - metastatic follicular thyroid cancer.
  - Struma ovarii.
- Exogenous hyperthyroidism.
  - "Hamburger" hyperthyroidism.
  - Overdosage of thyroxin.

### Causes of hypothyroidism :

- Congenital :
  - Thyroid dysgenesis.
  - Dyshormonogenesis.
  - Deficiency of TRH/TSH.
- Acquired forms in adults :
  - Primary hypothyroidism.
  - Hashimoto thyroiditis.
- Iatrogenic causes :
  - Thyroidectomy.
  - Radioidine therapy.
  - External neck irradiation
- Drugs (Iodine, lithium, amiodarone, thyreostatic therapy, interferon, tyrosin kinase inhibitors, anti-CD52 monoclonal antibody).
- Infiltrative disease.
- Environmental exposures.
- Consumptive hypothyroidism.

- Central (Secondary and tertiary) hypothyroidism.
- Resistance to thyroid hormone.
- Resistance to thyrotropin and thyrotropin-releasing hormone.

**Physiological effects of thyroid hormones :**

| Category | Effect |
|---|---|
| Clinical | Tremors, nervousness, exophthalmos, hyperactivity, weight loss |
| Physiological | Increased temperature, heart function |
| Calorigenic | Increased basal metabolic rate ($O_2$ consumption) |
| Carbohydrate metabolism | Increased glucose turnover, absorption |
| Protein metabolism | Anabolic, positive N balance |
| Lipid metabolism | Decrease in blood cholesterol |
| Development | Stimulation of growth and maturation |
| Reproductive | Fertility, pregnancy, ovulation |
| Hematological | Erythropoiesis |

**Antithyroid drugs :**

1. Thyroid hormone :
   - Thyroxine (T4).
   - Triiodothyronine (T3, Liothyronine).

2. Inhibit hormone synthesis :
   - Propylthiouracil.
   - methimazole.
   - Carbimazole.

3. Inhibit iodide trapping :
   - Thiocyanates ($-SCN$).
   - Perchlorates ($-ClO_4$).
   - Nitrates ($-NO_3$).

4. Inhibit hormone release :
   - Iodine.
   - Iodides of Na, K.
   - Organic iodide.

5. Destroy thyroid tissue :
Radioactive iodine $^{131}I$.

Note :
Wolf Chaikoff effect : Hypothyroidism from iodine/iodide supplementation.
Jod Basedow effect : Hyperthyroidism from iodine supplementation.

Grading of thyrotoxicosis based on heart rate :

- <90 = Normal.
- 90–110 = moderate thyrotoxicosis.
- >110 = Severe thyrotoxicosis.

Euthyroid sick syndrome : Abnormal thyroid function test results in patients with critical illnesses (TSH, T3 & T4 will be reduced).

## Investigations :

- Haemoglobin : PTU causes aplastic anemia.
- Platelets : Antithyroid drugs can cause thrombocytopenia.
- Total count : Antithyroid drugs can cause agranulocytosis
- Electrolytes : $Ca^{2+}$ (hypocalcemia after thyroidectomy), $Na^{+}$ & $K^{+}$ (Arrthymia).
- RFT : Vasculitis/AKI.
- TSH/T3/T4 : To check for HPA axis.
- X-ray neck (AP/lateral) : Look for tracheal compression, thymoma.
- ECG/ECHO : To rule out arrthymia.
- PFT (Flow Volume loop) : Square loop in large thyroid swelling.
- CT Neck with upper thorax.
- Blood grouping & RH.
- USG thyroid : To confirm solitary or MNG thyroid.
- Autoantibodies.

## Preparation of patient :

- Thyroid status : To make the patient euthyroid.
- Fasting : Hypothyroid patients will have reduced bowel emptying.
- Premedications : Hypothyroid patients will have CNS depression symptoms.
- Monitors : ECG, NIBP, temperature, ET $CO_2$.

## Induction :

- Hypothyroidism : Thiopentone sodium.
- Hyperthyroidism : Ketamine, etomidate.
- Euthyroid : Propofol.
- Difficult airway :
  - Fibro-optic bronchoscope
  - Rigid bronchoscope to prevent collapse of the trachea during induction.
- Regional anaesthesia : Non thyroid surgery.
- Maintenance : Intermediate acting muscle relaxants, short acting opiods.

- Positioning :
- Rose position.
  - Protect eyes with pads to prevent exposure Keratitis.
  - Aavoid hyperextension of the neck.
  - Head up position 10-15° to facilitate venous return.
- Hemodynamics :
  - Hypothyroidism : Phenylephrine to control BP.
  - Hyperthyroidism : Be cautious while using sympathomimetics.
- Extubation :
  - Only when patient is fully consious.
  - Chance of tracheomalacia in case of large thyroid swelling.
  - While removing ET tube pass a bronchoscope and slowly withdraw and check if the trachea is collapsing or not.
  - Check for active and passive leak test.
- Postoperative management : Analgesics.
- Complications :
  - Intra-op : Hemodynamic collapse, thyroid storm, arrthymia, injury to surrounding blood vessels & nerves, Kinking of tube, hemorrhage.
  - Post-op : Thyroid storm, Hypocalcemia, hemorrhage, hematoma.
- Management of myxedema coma/thyroid storm : manage accordingly.

# IHD PATIENT FOR LAPAROSCOPIC CHOLECYSTECTOMY

## Case presentation : History 00:00:25

Ayisha is a 50-year-old female from Sulthan Bathery, wayanad. She is a housewife who has studied up to the 12th standard. She is a known case of hypertension and coronary artery disease.

**Present complaints :**

Ayisha presented with recurrent episodes of right hypochondrial pain for the last year.

**History of present illness :**

- The patient has had recurrent episodes of right hypochondrial pain for the last 1 year.
- Aggravated by food intake.
- Associated with bloating sensation indigestion and nausea.
- Not associated with constipation or loose stools, no radiation of pain, no projectile vomiting, no positional variation of pain.
- Was admitted here 2 months back with severe abdominal pain, vomiting, and fever with chills.
- She was diagnosed with gallbladder stones and was treated with injections and advised surgery for removal of gall bladder after 6 weeks.
- Now the patient is asymptomatic and admitted for surgery.

**Past medical history :**

- She was diagnosed with hypertension 6 years back and was started on Tab amlodipine 5 mg once daily.
- She had recurrent episodes of left-sided chest pain associated with sweating and vomiting that started around 2.5 years back which usually get relieved on taking rest.
- 2 years back, she was admitted to ICU following left-sided chest pain with sweating and vomiting and was continuous pain not relieved with rest.
- There was associated chest tightness and breathlessness.
- She was diagnosed with coronary artery disease and underwent

emergency angioplasty and asked to continue drugs and regular follow-up.

- Now she is under regular treatment with 3 drugs for the same for the last 2 years apart from antihypertensive and was advised not to stop any of these.
- She is having dyspnoea on exertion grade 3 for the last 1 year (Progressed from NYHA class 1 to 3).
- No h/o DM, thyroid disease, renal or liver disease, no h/o CVA, no h/o brochial asthma, no valvular heart disease.
- No history of palpitation, syncope, facial edema or pedal edema.
- No cough with expectoration/pleuritic, chest pain.
- No orthopnoea or PND.
- No history of wheeze/haemoptysis/bluish discolouration.
- No history of any surgeries in the past.

**Personal history :**

- Sleep normal.
- Appetite reduced for last 2 months.
- Bowel and bladder habits normal.
- She takes a non vegetarian diet.
- No addictions.
- menopause at the age of 46 years.

**Drug history :**

- She is taking amlodipine once daily for hypertension.
- Aspirin, clopidogrel and atorvastatin for CAD.
- Not on any other medication.
- No documented drug allergy.

**Family history :**

- Her father was hypertensive and had a history of coronary artery disease.
- No history of DM/valvular heart disease/dyslipidaemia/congenital heart disease or sudden cardiac death in the family.

Socioeconomic status :

Belongs to a middle-class family.

General examination :

- Conscious and oriented.
- moderately built & well nourished.
- Weight 68 Kg, height 158 cm, BMI 27.24.
- No pallor, icterus, cyanosis, clubbing or generalised lymphadenopathy.
- No pedal edema/No varicosities.
- Skin and hair normal.
- Xanthelasma present near medial canthus of both eyes.

Vital signs :

- PR : 76/min regular, normal volume and character, normal vessel wall, and all peripheral pulses are palpated equal and bilateral.
- BP : 130/76 mmHg left upper limb in supine position, no postural hypotension.
- RR : 16/min thoracoabdominal, work of breathing normal.
- Afebrile.
- JVP : Not elevated.
- Skull and spine normal.

Airway examination :

- Upper airway normal.
- No facial dysmorphism.
- No bucking of tooth, no loose tooth/missing of tooth.
- Mallampatti classification grade 2.
- Mouth opening : 6 cm.
- Thyromental distance (TMD) : 7cm.
- TMJ admits one finger.
- Neck movements normal.

Cardiovascular system :

JVP not elevated.

Inspection :

- Shape of precordium normal.
- Apical impulse not visible.
- No suprasternal/epigastric or intercostal pulsations visible.
- No dilated veins scars or sinuses.

Palpation :

- Apex beat palpated in the left 5th intercostal space 1 cm lateral to midclavicular line, normal in character.
- No parasternal heave.
- No thrills or palpable pulsations.
- No palpable Pa.

Percussion :

- Right heart border corresponds to right sternal border.
- Left border corresponds to apex.
- Left intercostal space resonant.

Auscultation :

- 1st & 2nd heart sound heard in mitral, tricuspid, pulmonary and aortic areas.
- No murmurs, no added sounds, no carotid bruit.

GIT :

- mild tenderness in right hypochondrium : murphey's point.
- No organomegaly.
- No free fluid in abdomen.
- No mass palpable.
- Normal bowel sounds heard.

**Respiratory system :**

- Upper respiratory tract normal.
- Normal vesicular breath sounds heard.
- No added sounds.

**CNS :**

- Higher mental functions normal.
- No sensory/motor deficit.
- All reflexes normal.

**Summary :**

50 year old hypertensive lady with history of coronary artery disease underwent angioplasty with probable drug eluting stent on regular treatment with antihypertensive and antiplatelets now presented with right hypochondrial pain associated with indigestion, bloating sensation and occasional nausea and

vomiting with recent history suggestive of cholecystitis now admitted for laparoscopic cholecystectomy. She is also having progressive dyspnoea on exertion grade 3. On examination, stable vitals cardiomegaly and unremarkable systemic examination except for mild tenderness in murphey's point.

**Diagnosis :**

- 50 year old lady.
- Hypertensive on treatment.
- IHD post PTCA with drug eluting stent (DES) since 2 years on dual antiplatelet therapy.
- NYHA class 3 dyspnoea on exertion. RCRI score 2.
- No signs of CCF.
- Sinus rhythm.
- Admitted for laparoscopic cholecystectomy.

## Discussion

00:06:23

**Risk factors for development of IHD :**

| Non-modifiable. | modifiable. |
|---|---|
| • Age.<br>• male sex.<br>• Post menopausal women.<br>• Family history. | • Hypertension.<br>• DM.<br>• Obesity.<br>• Sedentary life style/stress.<br>• CKD.<br>• Smoking.<br>• Dyslipidaemia. |

**Angina pectoris :**

- Angina pectoris is characterised by :
  - Retrosternal pain/discomfort/heaviness.
  - which may radiate to neck, jaw, back or shoulder.
  - Crescendo decrescendo in intensity.
  - Lasting several minutes induced by physical or emotional stress.
- Cause : Produced when there is a demand supply mismatch to the blood supply of heart.
- Types :
  - Stable : Pain that lasts for 10 min and relieved by rest.
  - Unstable : Pain lasts >30 min & not relieved by rest or sublingual nitrate.

- Prinzmetal angina : Pain due to spasm of coronary arteries.

- Grades of angina : Canadian classification of angina.

| Canadian Cardiovascular Society grading of angina pectoris | |
|---|---|
| **Grade** | **Description** |
| Grade I | Ordinary physical activity does not cause angina, such as walking and climbing stairs. Angina with strenuous or rapid or prolonged exertion at work or recreation |
| Grade II | Slight limitation of ordinary activity. Walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals, or in cold, or in wind, or under emotional stress, or only during the few hours after awakening. Walking more than two blocks on the level and climbing more than one flight of ordinary stairs at a normal pace and in normal conditions |
| Grade III | Marked limitation of ordinary physical activity. Walking one or two blocks on the level and climbing one flight of stairs in normal conditions and at normal pace |
| Grade IV | Inability to carry on any physical activity without discomfort, anginal syndrome may be present at rest |

## Myocardial infarction :

Coronary circulation blocked by atheromatous plaque leading to ischemia.

## IHD classification :

- Stable angina.
- Acute coronary syndrome :
  a. Unstable angina : Cardiac markers normal.
  b. Acute STEMI :
  c. Acute NSTEMI :
  } Cardiac markers elevated.

Classification of MI based on duration :

- Acute MI : Within 7 days.
- Recent MI : 7-30 days.
- Prior MI : >30 days.

## Coronary circulation :

- Arises from the root of aorta. (RCA and LCA).
- RCA supplies : SA node, AV node & right ventricular muscle.
- LCA : LCX and LAD supplies left ventricle and septum.

Factors which will increase the myocardial oxygen demand :

- Stress.
- Tachycardia.
- Sympathetic overactivity.

## Assessment of the functional status of the patient :

- METs (Dukes Activity Index) : Oxygen consumption in a 60 Kg male at rest is 3.5ml/kg/min.
- Dukes activity status Index (DASI) :
  - $VO_a$ max = 0.43 * (Duke activity status index) + 9.6
  - METs = (0.43 x DASI + 9.6)/3.5
  - Higher the DASI score better the functional status better outcome (maximum score is 58.2, if less than 30 high chance of MACE).
- NYHA.

## Assessing risk associated with heart disease for non-cardiac surgery :

- Revised cardiac risk index.
- Goldman index.
- Eagles criteria.
- Detsky modified multifactorial index.
- Gupta myocardial infarction calculator (MICA).
- American college of surgeons surgical quality improvement plan (NSQIP).

**Table 3. Revised Cardiac Risk Index**

Ischemic heart disease (history of myocardial infarction, positive exercise test, current complaint of ischemic chest pain or use of nitrate therapy, or ECG with Q waves)

History of heart failure

History of cerebrovascular disease (transient ischemic attack, or cerebral infarction)

Insulin therapy for diabetes

Renal dysfunction (serum creatinine >2.0mg/dL)

High-risk type of surgery (major vascular surgery)

| Number of risk factors | Cardiovascular complications (%) (95% CI) | Cardiovascular death (%) |
|---|---|---|
| 0 | 0.5 (0.2–1.1) | 0.3 |
| 1 | 1.3 (0.7–2.1) | 0.7 |
| 2 | 3.6 (2.1–5.6) | 1.7 |
| ≥3 | 9.1 (5.5–13.8) | 3.6 |

CI, confidence interval. (Source: Prepared based on Lee TH, et al. *Circulation* 1999; **100**: 1043-1049.[7])