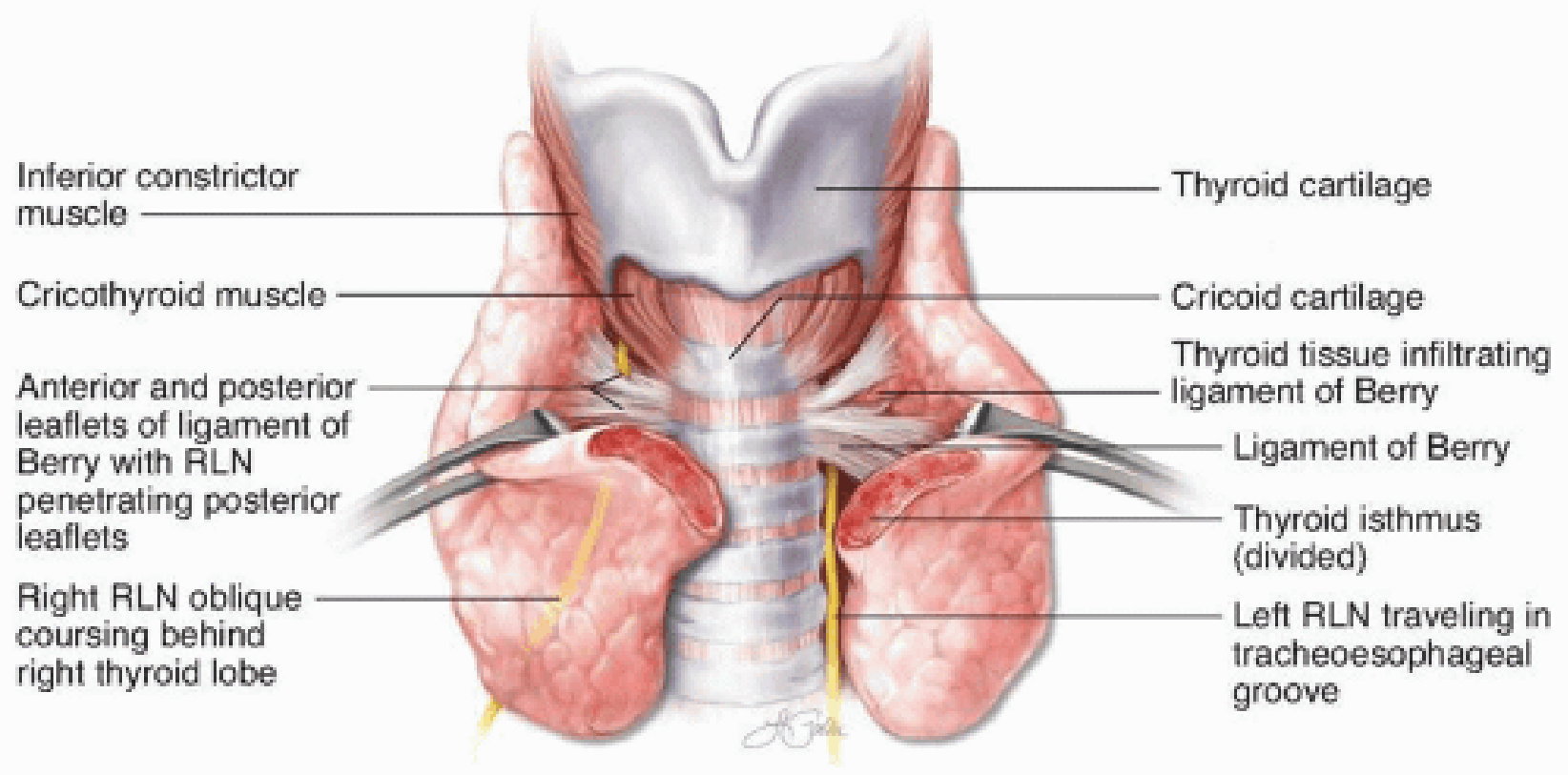
Thyroidectomy



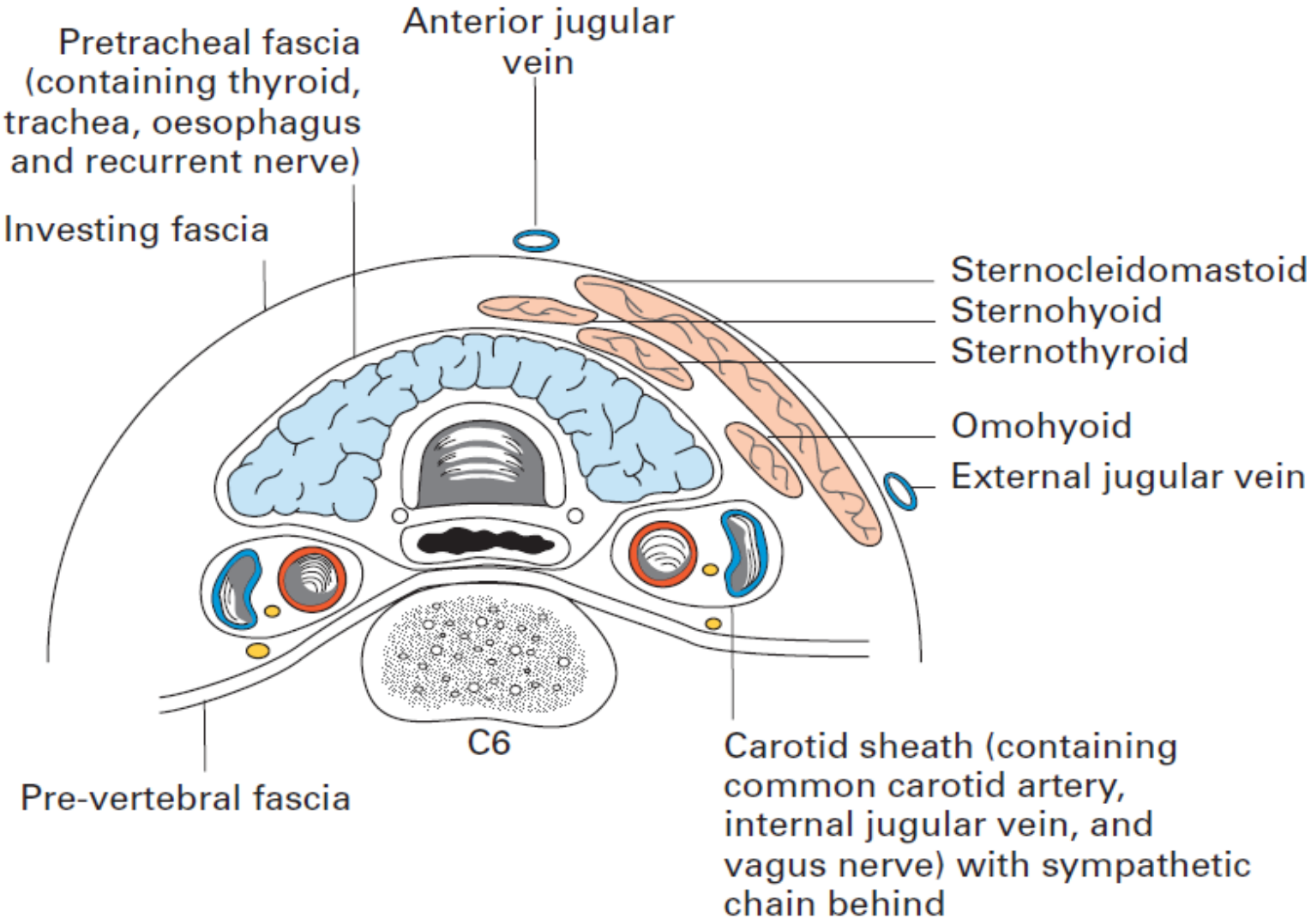
Anatomy of the Gland

- The thyroid is made up of
  - Isthmus - overlying the 2nd and 3rd rings of the trachea
  - Lateral lobes - each extending from the side of the thyroid cartilage downwards to the 6th tracheal ring
  - pyramidal lobe - projecting upwards from the isthmus usually on the left side, which represents a remnant of the embryological descent of the thyroid

Relations of the Gland

- The gland is enclosed in the pretracheal fascia, covered by the strap muscles and overlapped by the sternocleidomastoids
- The anterior jugular veins course over the isthmus
- When the thyroid enlarges, the strap muscles stretch and adhere to the gland so that, at operation, they often appear to be thin layers of fascia
- On the deep aspect of the thyroid lie the larynx and trachea, with the pharynx and oesophagus behind and the carotid sheath on either side

Relations of the Gland



Relations of the Gland

- **Two nerves** lie in close relationship to the gland;

External branch of the superior laryngeal nerve

- Related to superior pedicle of thyroid

Recurrent laryngeal nerves

- In the groove between the trachea and oesophagus
- Related to branches of the inferior thyroid artery

Arterial Supply

Superior Thyroid Artery	• Arises from the external carotid • Passes to the upper pole
Inferior Thyroid Artery	• Arises from the thyrocervical trunk of the 1st part of the subclavian artery • Passes behind the carotid sheath to the back of the gland
Thyroidea Ima Artery	• Is inconstant • When present, it arises from the aortic arch or the brachiocephalic artery

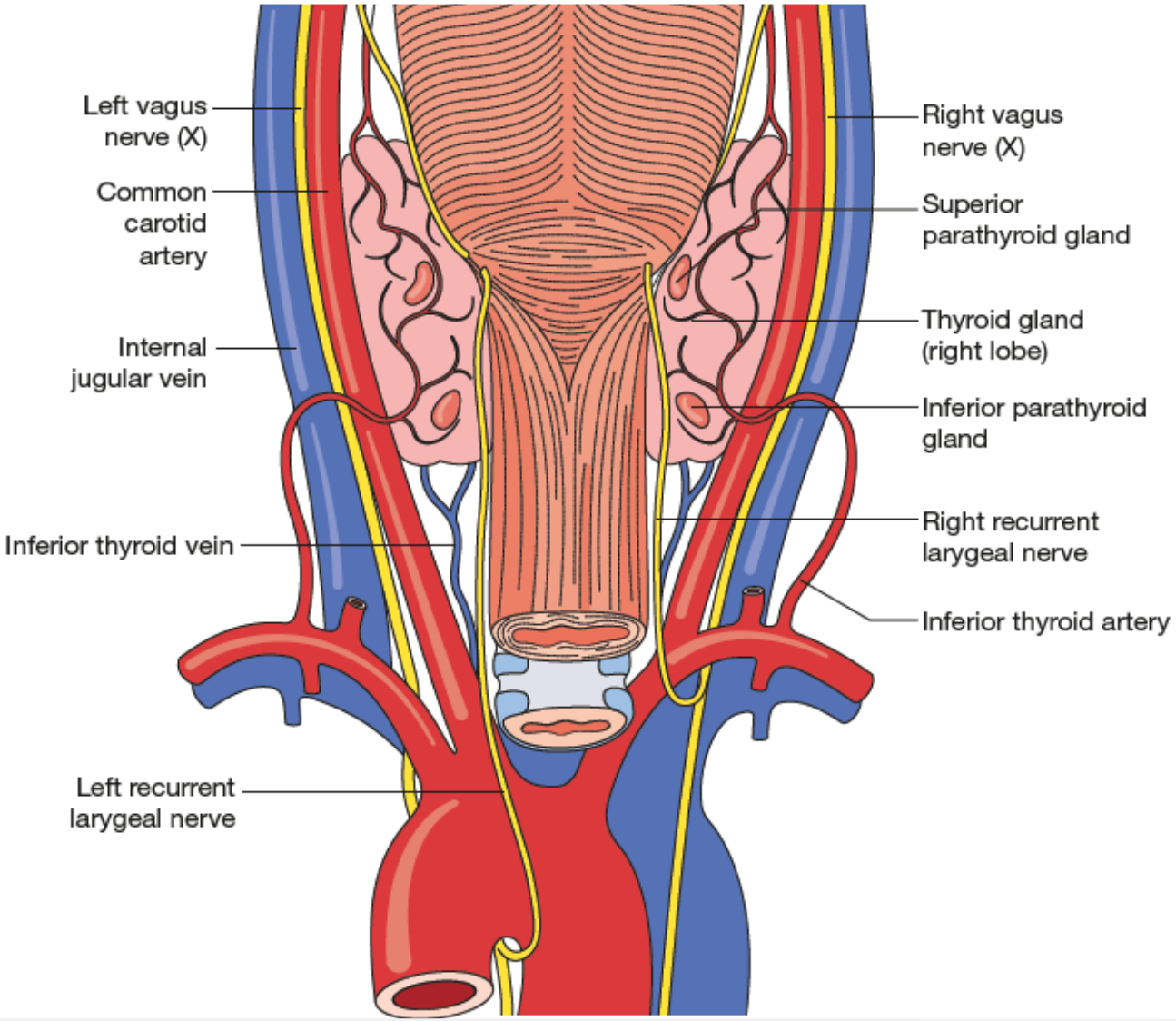
Venous Drainage

Superior Thyroid Vein	• Drains the upper pole to the internal jugular vein
Middle Thyroid Vein	• Drains from the lateral side of the gland to the internal jugular
Inferior Thyroid Veins	• often several • drain the lower pole to the brachiocephalic veins

Blood Supply

- Three arteries supply and three veins drain the thyroid gland
- As well as these named branches, numerous small vessels pass to the thyroid from the pharynx and trachea
- So that even when all the main vessels are tied, the gland still bleeds when cut across during a partial thyroidectomy

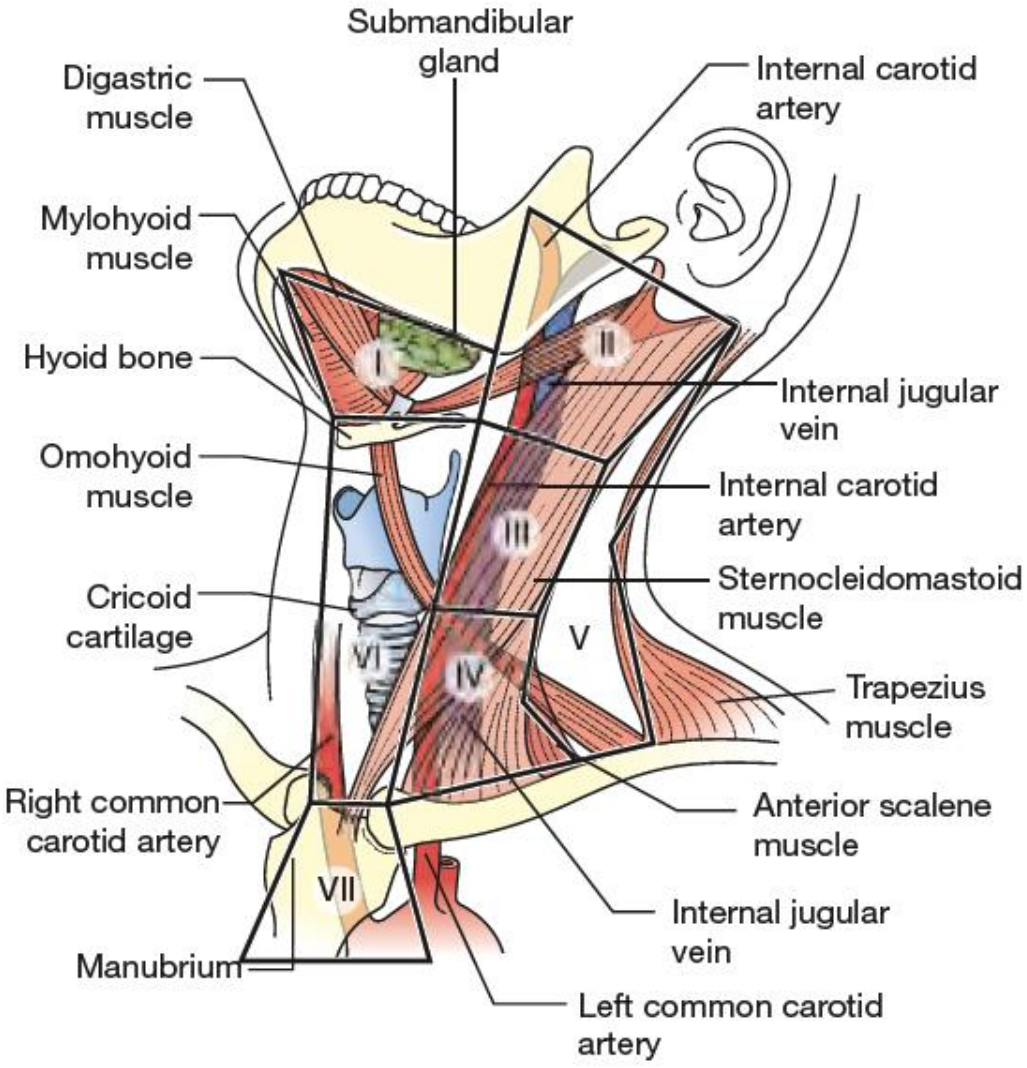
Blood Supply



Lymphatic drainage of the thyroid

- **Level VI Nodes- Pricipal drainage**
  - Central compartment juxtathyroid (Delphian)
  - Paratracheal
  - Nodes on the superior and inferior thyroid veins
- **Deep cervical Nodes**
  - Levels II, III, IV and V
- **Mediastinal Nodes**
  - Level VII

Cervical Lymph Node Levels



Indications for Thyroidectomy

- Pressure symptoms
- Malignant pathology/ indeterminate lesions (Thy 3f cytology)
- Retrosternal goitre
- Toxicity
  - Toxic nodule
  - Toxic MNG
  - Recurrent or treatment resistant Graves' disease
- Cosmesis
- RET genetic mutation

Types of Thyroidectomy

Total thyroidectomy	• Complete excision of both lobes, isthmus and any pyramidal lobe
Near total thyroidectomy	• Complete resection of one lobe, isthmus and most of the other lobe with preservation of a small thyroid remnant of tissues
Sub total thyroidectomy	• Partial resection of the bath lobes and resection of isthmus

Types of Thyroidectomy

Hemi thyroidectomy	• Complete resection of one lobe and the isthmus
Isthmusectomy	• Excision of the isthmus with any pyramidal tissue

Thyroidectomy

- Having made the decision to proceed to surgery, the first step is informed consent
- Patients should understand the risk of scar, RLN damage, bleeding, hypocalcaemia and hypothyroidism
- Endotracheal intubation is performed, and if a nerve monitor is to be used its position should be confirmed once the patient is in the surgical
- The patient lies supine with the neck extended
- Surgical preparation extends from the mandible on to the chest

Complications of thyroidectomy

Immediate

- Primary haemorrhage
- Damage to RLN or EBSLNTransient or permanent
- Damage to trachea or esophagus
- Thyrotoxic crisis
- Heart failure
- Severe dehydration
- Circulatory collapse
- Hypotension
- Hyperpyrexia

Complications of thyroidectomy

Early

- Respiratory obstruction
- Hypocalcaemia- in about 2-3 days
  - Features
    - Circum oral numbness
    - Chvostek's sign
    - Paraesthesia of fingers and toes
- Laryngeal spasm
- Hypothyroidism
- Reactionary and secondary bleeding
- Infection
- Stitch granuloma

Late

- Hypertrophic or keloid scar

Postoperative Complications

Haemorrhage

- Haemorrhage is the most frequent life-threatening complication of thyroidectomy
- Around 1 in 50 patients will develop a haematoma, and in almost all cases this will develop in the first 24 hours
- If an arterial bleed occurs, the tension in the central compartment pressure can rise until it exceeds venous pressure
- Venous oedema of the larynx can then develop and cause airway obstruction leading to death

Postoperative Complications

Haemorrhage

- Close monitoring of the wound is advised postoperatively
- If a haematoma develops, should remove skin sutures in order to release some pressure and seek senior advice immediately
- Endotracheal intubation should be used to secure the airway while the haematoma is evacuated and the bleeding point controlled

Recurrent laryngeal nerve paralysis

- Recurrent laryngeal nerve paralysis and voice change RLN injury may be unilateral or bilateral, transient or permanent
- Early routine postoperative laryngoscopy reveals a much higher incidence of transient cord paralysis than is detectable by simple assessment of the integrity of the voice and cough
- Such temporary dysfunction is not clinically important however, but voice and cord function should be assessed at first follow-up 4 weeks postoperatively
- Permanent paralysis is rare if the nerve has been identified at operation

Recurrent laryngeal nerve paralysis

- If a RLN is injured during surgery and the transected ends are identified, they should be reanastomosed
- This does not return mobility of the vocal cord but maintains neurological input to the muscles of the larynx
- Permanent vocal cord paralysis should be treated conservatively with speech therapy
- If voice quality is unacceptable, medialisation procedures can be performed
- Nerve grafting has shown promise but experience is limited

Recurrent laryngeal nerve paralysis

- Injury to the external branch of the superior laryngeal nerve is more common because of its proximity to the superior thyroid artery
- This leads to loss of tension in the vocal cord with diminished power and range in the voice
- Patients, particularly those who use their voice professionally, must be advised that any thyroid operation will result in change to the voice even in the absence of nerve trauma

Thyroid insufficiency

- Following total thyroidectomy, clearly thyroxine replacement will be required
- Around one in three patients who has a lobectomy will require supplementation rates are higher in those with thyroid autoantibodies
- Subtotal thyroidectomy was at one time performed with the aim of leaving sufficient tissue to maintain thyroid function

Parathyroid insufficiency

- This is due to removal of the parathyroid glands or infarction through damage to the parathyroid end arteries; often both factors occur together
- Vascular injury is probably far more important than inadvertent removal
- The incidence of permanent hypoparathyroidism should be less than 1% and most cases present dramatically 2–5 days after operation
- But, very rarely, the onset is delayed for 2–3 weeks or a patient with marked hypocalcaemia may be asymptomatic
- The complication is limited to total thyroidectomy, as when lobectomy is performed the contralateral parathyroid glands are sufficient to maintain calcium levels

Thyroid Crisis

- Thyroid crisis or ‘thyroid storm’ is rare condition, with a mortality of 10%
- Rapid deterioration of hyperthyroidism with hyperpyrexia, severe tachycardia, extreme restlessness, cardiac failure and liver dysfunction.
- It is usually precipitated by stress, infection or surgery in an unprepared patient, or by radio-iodine therapy

Thyroid Crisis

- Treatment is urgent
- This requires ;
  - administration of intravenous fluids
  - cooling the patient with ice packs
  - administration of oxygen
  - diuretics for cardiac failure
  - Digoxin for uncontrolled atrial fibrillation
  - sedation
  - intravenous hydrocortisone
- Specific treatment is by;
  - Carbimazole 10–20 mg 6-hourly
  - Lugol's iodine 10 drops 8-hourly by mouth or sodium iodide 1g
  - IV Propranolol intravenously (1–2 mg) or orally (40 mg 6-hourly) will block β-adrenergic effects

Wound infection

- Cellulitis requiring prescription of antibiotics
- Often by the general practitioner, is more common than most surgeons appreciate
- A significant subcutaneous or deep cervical abscess is exceptionally rare and should be drained

Hypertrophic Or Keloid Scar

- This is more likely to form if the incision overlies the sternum and in dark skinned individuals
- Intradermal injections of corticosteroid should be given at once and repeated monthly if necessary
- Scar revision rarely results in significant long-term improvement

Stitch granuloma

- This may occur with or without sinus formation and is seen after the use of non-absorbable, particularly silk, suture material
- Absorbable ligatures and sutures should be used throughout thyroid surgery
- Some surgeons use a subcuticular absorbable skin suture rather than the traditional skin clips or staples

Postoperative Care

- Following surgery, the patient should be returned to the recovery room and nursed overnight on the ward
- Wound care should include vigilance for signs of a haematoma
- Following total thyroidectomy, calcium levels should be checked postoperatively
- Not all patients develop immediate hypocalcaemia and they should be educated about the signs (parasthesia of the fingers and toes or round the mouth)
- Serial calcium monitoring should be recommended for those at highest risk

Postoperative Care

- Those patients who had a total thyroidectomy require thyroxine replacement, which should start day 1 postoperatively
- On clinic review, in addition to checking the histology report, the wound should be inspected and the larynx examined for vocal cord function
- Biochemical assessment of thyroid function and calcium, if required, should be arranged