

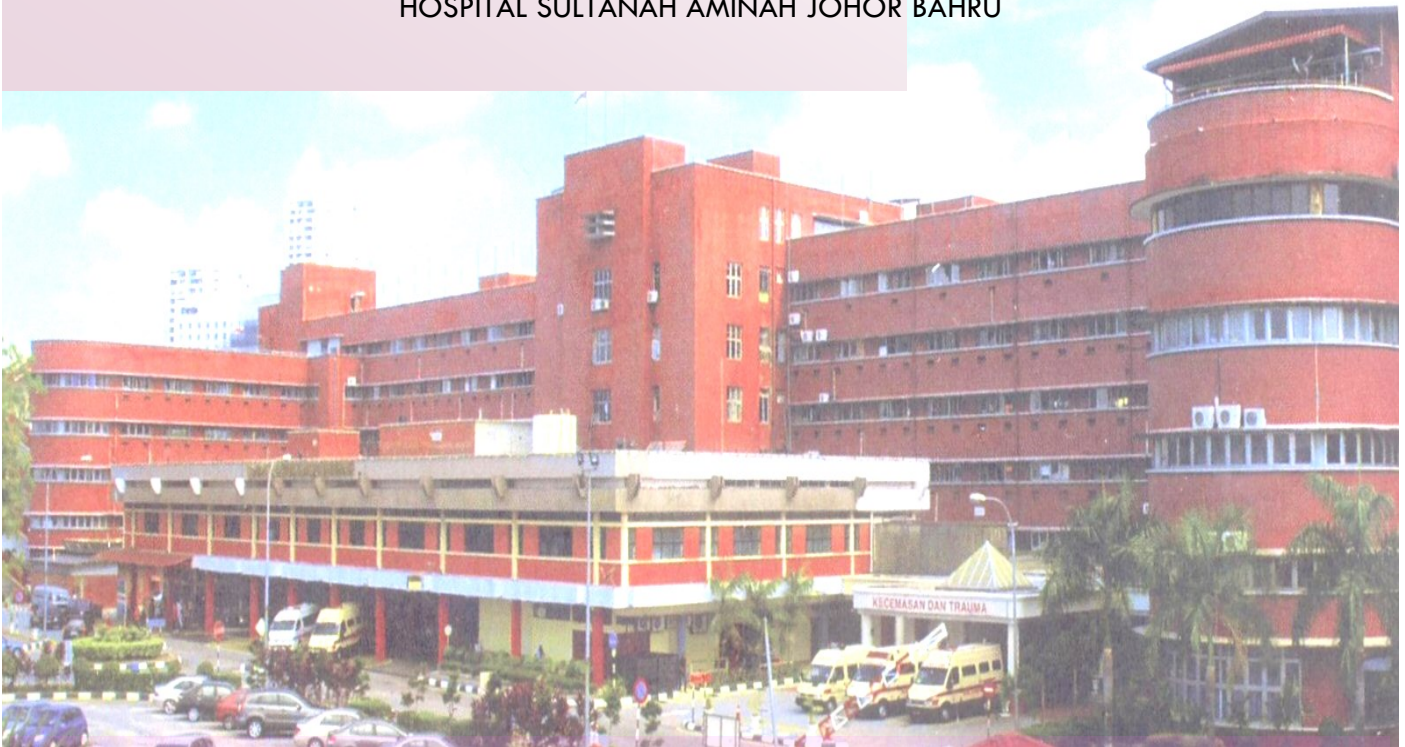


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BULETIN PENAWAR

HOSPITAL SULTANAH AMINAH JOHOR BAHRU



MANAGEMENT OF OSTEOPOROSIS

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CPG: Management of Osteoporosis

PREPARED BY YEAN YAN BIN

Definition

Osteoporosis is a skeletal disorder characterized by compromised bone strength, leading to an increased risk of fracture.

Common Clinical Presentation

- Increasing dorsal kyphosis
- Low trauma fracture
- Loss of height
- Back pain



Screening & Diagnosis

- Gold Standard: Bone Mineral Density (BMD) using Dual Energy X-Ray Absorptiometry (DXA)
- Fracture Risk Assessment Tool (FRAX)
- Quantitative Computed Tomography (QCT)
- Osteoporosis Self Assessment Tool for Asians (OSTA)

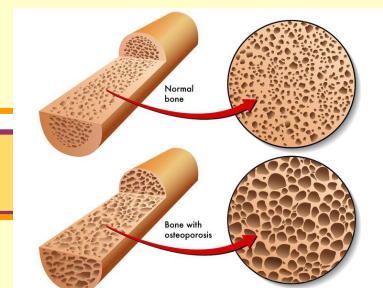
Risk Factors

Non Modifiable

- Advancing age
- Ethnic group (Oriental & Caucasian)
- Premature menopause (<45 years)
- Family history of osteoporotic hip fracture in 1st degree relative
- Personal history of fracture as an adult

Modifiable

- Low calcium and/or vitamin D intake
- Sedentary lifestyle
- Cigarette smoking, excessive alcohol & caffeine intake
- Low body weight (BMI < 19kg/m²)
- Oestrogen deficiency
- Impaired deficiency
- Recurrent falls



Bone Mineral Density (BMD)

- BMD peaks during 3rd decade of life and declines with advancing age.
- In women, this decline accelerates with menopause for 5-10 years.

Normal	T-score ≥ -1.0
Osteopenia	$-1.0 > \text{T-score} > -2.5$
Osteoporosis	T-score ≤ -2.5
Severe/ Established Osteoporosis	T-score ≤ -2.5 + presence of 1 or more fragility fracture

Prevention of Osteoporosis & Falls

1. Nutrition: Daily intake of 1g calcium & 800IU vitamin D. Avoid excessive dieting or extremely low body weight, limit caffeine intake, limit alcohol intake and quit smoking.
2. Regular physical activity, in particular weight-bearing exercise.
3. Conduct fall evaluation and carry out interventions as needed (e.g. : gait training. home hazard modification, physical therapy, withdrawal of medicines that increase risk of falling).
4. Use hip protectors to reduce the impact on hip during falls.
5. Pharmacological agents: hormone therapy, selective estrogen receptor modulators, bisphosphonates, vitamin D supplement.

Management of Postmenopausal Osteoporosis

① HORMONE THERAPY

- 1st line treatment for prevention & treatment of osteoporosis in women < 60 years old.
- Not recommended in women > 60 years old for sole purpose of osteoporotic fractures due to increased risk of cardiovascular events, stroke, venous thromboembolism (VTE) and breast cancer.
- Examples:
 - Conjugated Estrogen 0.3mg-0.625mg daily.
 - Estradiol 1mg + Dydrogesterone 5mg ; 1 tab daily.
 - Conjugated Estrogen 0.625mg + Medroxyprogesterone acetate 2.5mg ; 1 tab daily.



② BISPHOSPHONATES

- Potent inhibitor of bone resorption
- Examples:
 - Alendronate sodium 70mg + Cholecalciferol 5600IU (Fosamax Plus®) 1 tab once weekly
 - Risedronate* 35mg once weekly
 - Ibandronic Acid 150mg once monthly
 - Zoledronic Acid* 5mg by IV infusion over at least 15 minutes once yearly.
- Common side effects: nausea, vomiting, diarrhoea, headache, hypocalcaemia, musculoskeletal pain.
- Serious side effects: atypical femoral shaft fracture and osteonecrosis of the jaw.
- Counselling points: Take bisphosphonates in the morning with a full glass of plain water at least 30 minutes before food or drink. Remain upright during this time and until after you eat. Swallow whole. Do not take antacids, calcium, iron or mineral supplements.



*not listed in FUKKM

③ RALOXIFENE

- Selective estrogen receptor modulators (SERMs).
- Dosage: 60mg daily.
- Side effects: VTE, hot flushes, leg cramps.
- Contraindicated in women with history of VTE or risk of coronary heart disease.

④ DENOSUMAB

- Human monoclonal antibody (IgG2).
- S/C 60mg every 6 months.
- Side effects: eczema, hypercholesterolaemia and hypocalcaemia.
- Contraindicated in hypocalcaemia individual.

⑤ TERIPARATIDE *

- Recombinant Human PTH 1-34 (r-PTH).
- Dosage: S/C 20mcg once daily for a max of 24 months.
- Side effects: nausea, headache, dizziness, muscle cramp, arthralgia and hyperuricaemia.

*not listed in FUKKM



⑥ TIBOLONE *

- Selective tissue estrogenic activity regulator.
- Dosage: 2.5mg daily.
- Side effects: abdominal pain, bloating, weight gain, vaginal spotting and breast pain.
- Contraindicated in women > 60 years old, strong risk factors for stroke and personal history for breast cancer or long term use (> 5 years)*

* Listed in FUKKM but off label use for prevention of postmenopausal osteoporosis.

⑦ CALCIUM

- Calcium supplementation alone, despite not adequate for fracture prevention, is necessary for optimal response to other treatment modalities.
- Eg: Calcium Carbonate 1g-2.5g elemental calcium daily in divided doses; Calcium Lactate 1-5g daily in divided doses.
- Side effects: nausea, vomiting, abdominal pain and constipation.

⑧ ACTIVATED VITAMIN D

- Activated vitamin D increases bone mineral density in individuals with established osteoporosis & reduce fractures risk.
- Eg: Calcitriol 0.25mcg twice daily; Alfacalcidol 1mcg daily, maintenance dose 0.24mcg-2mcg daily.
- Side effects: hypercalcaemia, nausea and vomiting.

Management of Secondary Osteoporosis

① GLUCOCORTICOID-INDUCED OSTEOPOROSIS

- Osteoporosis is a major complication of glucocorticoid therapy.
- Prednisolone 5mg daily or its equivalent, for more than 3 months is associated with osteoporosis.
- Prescribing lowest effective dose of glucocorticoid for disease control.
- Use of alternative route of administration (eg: inhaled steroids in asthma).
- Modification of lifestyle - adequate calcium intake, adequate mobilisation, regular exercise and prevention of falls.
- In hypogonadal states, replacement therapy with sex steroids should be considered.
- All patients on glucocorticoids should be supplement with calcium & vitamin D (1000-1500 mg/day and 800 IU/day respectively).

② RENAL OSTEODYSTROPHY

- Renal osteodystrophy is a common complication of renal disease particularly those on dialysis. The severity increases with duration of dialysis.
- Treatment: correction of acidosis, hyperphosphatemia and hypocalcaemia.

③ AMENORRHOEA

- Extreme physical activity, anorexia nervosa and hypogonadal disorders in young women may be associated with low bone mineral density.
- Treatment: hormone replacement.

④ DRUGS

- Drugs that alter bone metabolism includes anti-convulsants, cyclosporin, tacrolimus, thiazolidinediones, exchange resins and long-term heparin.
- Encourage patient to remain physically active & consume 800IU vitamin D & 1g calcium daily.
- If fracture risk is high, consider treatment.



Management of Male Osteoporosis

- 50-60% of cases are due to secondary causes such as hypogonadism (including androgen deprivation therapy), excessive alcohol intake, hyperparathyroidism, intestinal disorders, malignancies, glucocorticoid therapy and immobilisation.
- Treatment options: bisphosphonates, teriparatide (r-PTH), denosumab, androgen (for hypogonadal men).

References

1. CPG Management of Osteoporosis 2nd Edition (2015)
2. Hospital Drug Formulary HSAJB 2020
3. UpToDate: Overview of The Management of Osteoporosis in Postmenopausal Women

Management of Thyroid Disorder

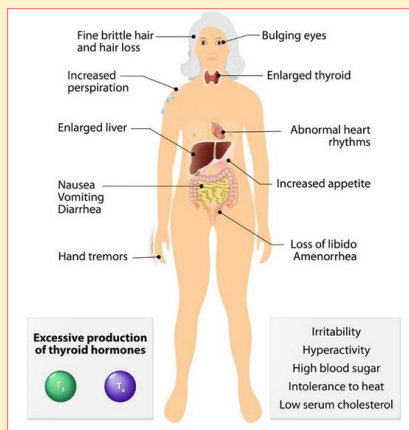
PREPARED BY CHONG SHU HUI

HYPERTHYROIDISM

CAUSES

- Graves' disease
- Toxic adenoma and toxic multinodular goiter
- Autoimmune - Hashimoto's thyroiditis
- Infective -subacute thyroiditis, Mycobacterium tuberculosis
- Exposure to exogenous source - Over the counter (OTC) supplements contain various amounts of T3 and/or T4 or cooked animals' thyroid gland
- Amiodarone-induced thyrotoxicosis, contrast iodine-induced hyperthyroidism

SIGNS AND SYMPTOMS



- Irritability
- Mood swings
- Difficulty sleeping
- Heat intolerance
- Muscle weakness
- Loss of interest in sex
- Goitre
- Palpitations
- Weight loss despite increased appetite
- Excessive sweating
- Hair loss

TREATMENT OF HYPERTHYROIDISM

Antithyroid

Propylthiouracil (PTU)

Carbimazole

SIDE EFFECTS

Common

- Cutaneous side effects e.g. pruritus, rash (more common with PTU or high dose carbimazole (30mg/day))

Serious

- Agranulocytosis
- Hepatic damage (more common in PTU)

MONITORING

- Inform doctor if develop **pruritic rash, jaundice, acholic stools, or dark urine, arthralgias, abdominal pain, nausea, fatigue, fever, or pharyngitis.**
- The medication should be continued approximately 12–18 months and then discontinued if TSH levels are normal at that time.
- Obtain serum free T4 and free T3 about 2–6 weeks after initiation of therapy.
- Once euthyroid levels are achieved with the minimal dose of medication, monitor serum T4 and T3 levels every 2-3 months.

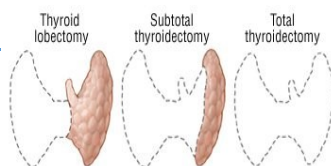
	Carbimazole	Propylthiouracil (PTU)
Initial dose	10–30mg daily in divided doses given 8 hourly	50-150mg given 8 hourly, depending on the severity of the hyperthyroidism.
Maintenance dose	Titrated down to 5–10mg daily for at least 12 – 18 months	Reduce to 50mg 2 or 3 times daily for at least 12 – 18 months
Pregnancy	Avoid use (can cause birth defects)	Safe for first trimester
Breastfeeding	Lowest effective dose (small amount of these medications are transferred into the breast milk)	
Pediatric dose	0.2–0.5mg/kg daily, with a range from 0.1mg/kg to 1.0 mg/kg daily maximal initial dose: 30mg daily	Avoid in children due to risk of idiosyncratic liver failure except in selected circumstances

② RADIOACTIVE IODINE (RAI)

- Contraindicated to used in pregnancy
- Avoid in very young children (<5 years)



ADMINISTRATION	Radioactive iodine-131 is administered in a single application (in the form of capsule or liquid)
DOSE	<ul style="list-style-type: none"> • Typically a mean dose of 10–15 mCi (370–555 MBq) • Second dose of RAI given 6 months after the first RAI treatment – if patient remain hyperthyroid
PRIOR RAI	<ul style="list-style-type: none"> • Avoid iodinated radiocontrast and beta-adrenergic blocking drugs • Keep a low-iodine diet to increase the proportion of RAI trapped • Avoid nutritional supplements that may contain excess iodine and seaweeds for at least seven days • Discontinue Antithyroid Drug e.g. Carbimazole 2–3 days prior to RAI and restart ATDs 3–7 days after RAI administration and tapered as thyroid function normalizes
MONITORING	Lifelong annual thyroid function testing once euthyroidism is achieved
DISADVANTAGES	<ul style="list-style-type: none"> • Permanent hypothyroidism (develop 2-6 months after RAI), may require thyroid hormone replacement – Levothyroxine (dose adjusted based on T4 levels) • Radiation exposure



③ SURGERY

PREFERRED TREATMENT	<ul style="list-style-type: none"> • Women planning a pregnancy in <6 months provided thyroid hormone levels are normal • Symptomatic compression or large goiters (>80 g) • Relatively low uptake of RAI • Patients with moderate-to-severe active Graves' ophthalmopathy (GO)
COMPLICATIONS	<ul style="list-style-type: none"> • Hypocalcemia due to hypoparathyroidism which can be transient or permanent • Recurrent or superior laryngeal nerve injury leading to hoarse voice • Postoperative bleeding • Complications related to general anesthesia

④ BETA BLOCKERS

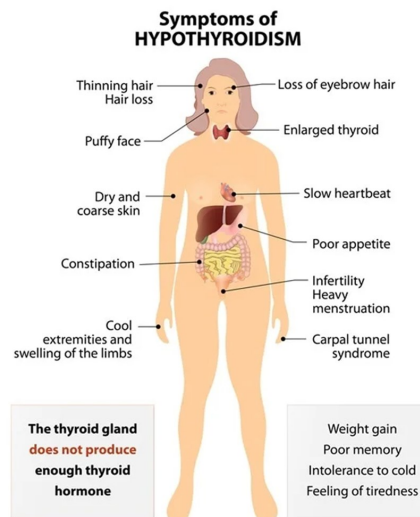
Used to ameliorate thyrotoxic symptoms such as palpitations, anxiety, tremor and heat intolerance

	Dose	Frequency	Comments
Propranolol	10-40mg	8 hourly or 6 hourly	<ul style="list-style-type: none"> • Non-selective beta blocker • Decreases T4 to T3 conversion
Atenolol	25-100mg	Once daily	<ul style="list-style-type: none"> • Selective beta blocker • Safer than propranolol in asthma or COPD • Better compliance

HYPOTHYROIDISM

CAUSES

- Autoimmune - Hashimoto thyroiditis (\uparrow Anti-TPO antibodies)
- Post-therapeutic hypothyroidism - after radioactive iodine therapy or surgery for hyperthyroidism or goiter
- Drug therapy (e.g., carbimazole, lithium, iodine, amiodarone interference)
- Iodine deficiency



TREATMENT OF HYPOTHYROIDISM

THYROID HORMONE REPLACEMENT

LEVOTHYROXINE (LT4)

HOW TO TAKE LT4

- Take on **empty stomach** (1 hour before breakfast or at bedtime, at least 3 hours after the last meal of the day).
- **Consistently take it before breakfast** each day (improve compliance).
- Potentially **interfering medications** and supplements. Recommend four-hour separation.
- **Adjust levothyroxine dose** when started medication that alter T4 metabolism i.e. antiepileptics such as **phenobarbital, phenytoin, and carbamazepine, or other medications such as rifampicin and sertraline.**

Interference with absorption

Bile acid sequestrants (cholestyramine, colestipol, colesevelam)	Calcium salts (carbonate, citrate, acetate)	Diet
Sucralfate	Chromium picolinate	• Ingestion with a meal
Cation exchange resins (Kayexelate)	Charcoal	• Grapefruit juice
Oral bisphosphonates	Orlistat	• Espresso coffee
Proton pump inhibitors	Ciprofloxacin	• High fiber diet
Raloxifene	H ₂ receptor antagonists	• Soybean formula (infants)
Multivitamins (containing ferrous sulfate or calcium carbonate)	Malabsorption syndromes	• Soy
Ferrous sulphate	• Celiac disease	
Phosphate binders (sevelamer, aluminum hydroxide)	• Jejunioileal bypass surgery	
	• Cirrhosis (biliary)	
	• Achlorhydria	

USE OF LT4 IN SPECIAL POPULATION

PREGNANCY

- Pregnant women who are already treated with LT4 before conception are recommended to have their LT4 dosage increased by 30%–50% upon conception.
- After delivery, the LT4 dosage can be generally re-adjusted to the pre pregnancy requirement.

CHILDREN

- ⇒ Age 1–3 years: 4–6mcg/kg
 - ⇒ Age 3–10 years: 3–5mcg/kg
 - ⇒ Age 10–16 years: 2–4mcg/kg
- Alternatively, the dose can be calculated based on the body surface area as approximately 100mcg/m²/day.

ELDERLY

- Start with small dose -25 or 50mcg daily.
- The dose of levothyroxine should be increased by 25mcg/day every 14–21 days until a full replacement dose is reached.

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1. Clinical Practice Guidelines 2019. Management of Thyroid Disorder.
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LAPORAN JK KEBAJIKAN DAN SOSIAL FARMASI 2021 BIL 1

Jawatankuasa Kebajikan dan Sosial Farmasi bagi Tahun 2021 terdiri daripada 24 orang anggota yang dipengerusikan oleh Puan Low Yee Bee. Jawatankuasa Kebajikan dan Sosial Farmasi melaksanakan pelbagai aktiviti dan sambutan yang berkaitan dengan kebajikan semua anggota Jabatan Farmasi. Antara aktiviti yang dijalankan adalah Sambutan Tahun Baru Cina, Sambutan Hari Raya Aidilfitri, Sambutan Deepavali dan Krismas, serta meraikan Sambutan Hari Lahir, anggota yang bersara dan berpindah/bertukar (keluar dari HSAJB), dan juga memberi bantuan terhadap ahli keluarga terdekat; cth ibu bapa, pasangan, anak dan mertua) yang meninggal dunia. Selain daripada itu, Jawatankuasa Kebajikan juga memberikan sumbangan untuk aktiviti sukan dan memberikan sumbangan atau hadiah kepada ahli yang baru mendirikan rumah tangga, melahirkan cahaya mata (untuk semua anak) serta memberikan bantuan dalam bentuk wang tunai untuk ahli yang sakit/dimasukkan ke dalam wad. Di samping itu, JK Kebajikan juga mengadakan Hari Keluarga Farmasi atau *Pharmacy Night*.

Bagi penggal pertama Tahun 2021 (Januari hingga Mac 2021), AJK Kebajikan dan Sosial Farmasi telah melaksanakan aktiviti Sambutan Tahun Baru Cina dan Sambutan Hari Lahir bagi bulan Januari hingga Mac. Sambutan dilaksanakan pada hari Rabu, iaitu 24hb Mac 2021, di Bilik Mesyuarat Unit Farmasi Logistik. Sambutan tersebut juga meraikan beberapa anggota Farmasi yang akan berpindah keluar pada bulan April 2021. Seramai 46 orang anggota menyambut Hari Lahir pada bulan Januari hingga Mac, seorang anggota melahirkan cahaya mata dan 6 orang anggota yang berpindah keluar.

Berikut dilampirkan beberapa gambar sepanjang Sambutan Tahun Baru Cina dan Hari Lahir Bil 1 yang lepas.





Word Search Puzzle



Oxymetazoline Pseudoephedrine Naproxen Ibuprofen Acetaminophen Aspirin Cisplatin Capecitabine Trastuzumab Grisetron Timolol Isotretinoin Sildenafil Ranitidine Pantoprazole Ondansetron Omeprazole Morphine Oxycodone Fentanyl Pregabalin Gabapentin Lidocaine Tramadol Celecoxib Budesonide