JPP September 2021 Copy

7 days of alendronic acid

Day 1: Developed in the cleaning industry in 19th century to prevent calcium deposition, [#bisphosphonates](https://twitter.com/search?q=%23bisphosphonates) have been in medical use since the 1960s. Recognition of affinity for hydroxyapatite crystals in bone led to medical applications & [#alendronic](https://twitter.com/search?q=%23alendronic) acid was licensed by EMA in 2005

Day 2: 2nd generation bisphosphates e.g [#alendronic](https://twitter.com/search?q=%23alendronic) acid are used for the prevention & treatment of osteoporosis in men & women. Optimum duration of treatment is unclear, but is at least 3 years. Some are also licensed for Paget’s disease e.g [#risedronate](https://twitter.com/search?q=%23risedronate) & malignant bone disease e.g [#pamidronate](https://twitter.com/search?q=%23pamidronate)

Day 2 (cont);Daily [#alendronate](https://twitter.com/search?q=%23alendronate) 10mg once daily; treatment of osteoporosis with [#risedronate](https://twitter.com/search?q=%23risedronate) can be 5mg once daily or 35mg once weekly

Day 3: Adequate oral bioavailability taken before food; person must be upright 30 mins after swallowing to reduce the risk of oesophagitis. Drug taken up in bone lasts 10 years! No metabolism & unabsorbed drug rapidly excreted in urine. Renal impairment can mean accumulation in bone; avoid eGFR < 35mL/min/1.73m2

Day 4: A synthetic analogue of pyrophosphate, [#alendronic](https://twitter.com/search?q=%23alendronic) acid inhibits an osteoclastic enzyme (FPP) involved with isoprenoid lipid synthesis. Osteoclast function (resorption of bone) relies on small GTPases which, in turn, rely on isoprenoid led modifications. Bisphosphonates such as [#alendronic](https://twitter.com/search?q=%23alendronic) acid reduce osteoclast activity & induce apoptosis. Reducing rate of bone turnover helps bone malignancy, bone pain & hypercalcaemia. May also help prevent metastasis to bone e.g breast cancer

Day 5: ADEs; Common include GI disturbance/pain, nausea, MSK pain, vertigo, headache, pruritis, asthenia, oesophagitis. Uncommon/serious; eye inflammation, osteonecrosis jaw, atypical femoral fracture, photosensitive rash, SJS (not exhaustive).

Day 5 (cont): Alopecia associated with [#bisphosphonates](https://twitter.com/search?q=%23bisphosphonates) [#alendronic](https://twitter.com/search?q=%23alendronic) acid may occur because of interference with the mevalonate pathway. Disruption of cholesterol homeostasis could affect the hair follicle, but the mechanism for this remains unclear.

Day 6: Drug-drug interactions [#alendronic](https://twitter.com/search?q=%23alendronic) acid are all moderate e.g relating to reduced absorption or GI irritation, except for GI bleeding risk with deferasirox (severe). NOTE there is a very useful NICE ‘patient decision aid’ to assist choice, found at [nice.org.uk/guidance/ta464…](https://t.co/1ydUHfHaWH)

Day 7: Development of the nitrogen-containing bisphosphonates has led to improved biological activity, duration of action & potency. i.v infusion of [#zoledronate](https://twitter.com/search?q=%23zoledronate) is now used for hip/femoral neck fracture prevention in women with osteopenia once every 18 months as single 5mg dose (off-license)

CPD: in addition to the tweets, read the BNF section on osteoporosis, as well as the monograph on alendronic acid, which contains a general bisphosphonate overview. The SPC for alendronic acid contains significant detail about the background and clinical application of this drug

<https://bnf.nice.org.uk/treatment-summary/osteoporosis.html>

<https://bnf.nice.org.uk/drug/alendronic-acid.html>

<https://www.medicines.org.uk/emc/product/6050/smpc#gref>

1. The bisphosphonate drugs are used for prevention, but not treatment of osteoporosis

TRUE or FALSE

1. Why should oral bisphosphonates be taken standing up for at least 30 minutes?
2. To ensure the whole drug is absorbed
3. To remind people that no food should be taken during this time
4. To help prevent the tablet becoming lodged in the oesophagus leading to oesophagitis
5. Because correct posture will help to prevent stomach electrolyte contents from binding to the drug
6. Risedronate, pamidronate and zoledronic acid are all licensed for use in Paget’s disease of bone

TRUE or FALSE

1. Bisphosphonate drugs bind so strongly to bone crystals they remain in the body for years

TRUE or FALSE

1. Which best describes the mechanism of action for all bisphosphonates
2. Inhibits osteoclastic action and reduces cell numbers by inducing apoptosis
3. Inhibits osteoblastic action and reduces cell numbers by inducing apoptosis
4. Prevents bone turnover by inducing bone marrow suppression leading to reduced osteoclast cell population
5. Prevent calcium deposition on bone by preventing chloride deposition
6. The BNF contains ‘important safety information’ about the risk of damage to bone from these drugs, which can cause bone fracture or necrosis

TRUE or FALSE

1. Which of the following is a common adverse drug event?
2. Osteonecrosis of the jaw
3. Oesophagitis
4. Severe cutaneous adverse reactions (SCARs)
5. Angioedema
6. Oral antacids will increase the oral absorption of bisphosphonate drugs

TRUE or FALSE

1. There are a variety of dosing regimens for the bisphosphate drugs, ranging from daily administration to once every 18 months

TRUE or FALSE

1. Some patients may benefit from a bisphosphonate ‘holiday’ given the long-lasting effects of this drug group

TRUE or FALSE