Investigation and treatment of Vitamin D deficiency / insufficiency in adults

Does the patient have ≥1 CLINICAL or BIOCHEMICAL FEATURE of vitamin D deficiency?
- widespread bone pain or tenderness or myalgia
- proximal muscle weakness
- tenderness over pseudo fractures
- Insufficiency fractures
- low serum calcium or high ALP

No

Vitamin D testing not required at this stage

+ Give Lifestyle advice

Yes

Does the patient have ≥1 RISK FACTOR for vitamin D deficiency?
- elderly and housebound
- pregnancy & breast feeding
- darker skinned people
- low sun exposure (e.g. habitual skin covering, housebound, skin conditions)
- vegan/vegetarian
- liver/renal disease
- malabsorption
- anticonvulsants, glucocorticoids, rifampicin or anti-retrovirals
- obesity
- Known disorder of calcium metabolism

No

Exclude other causes of symptoms then restart pathway

Have other causes for symptoms been excluded?

Yes

Carry out tests for suspected vitamin D deficiency: 25-OHD, Ca²⁺, ALP, PO₄, also U+Es, LFTs, FBC. PTH is elevated in vitamin D deficient states but routine measurement not indicated.

No

Do any of the following apply?
- focal bone pain
- skeletal deformity
- malabsorption
- renal stones
- chronic renal disease, severe liver disease, lymphoma, metastatic cancer, parathyroid disorders, sarcoidosis, TB
- Atypical biochemistry (e.g. low vit D and hypercalcaemia)
- Pregnancy or breastfeeding

Yes

Refer to appropriate secondary care specialist(s).

If patient referred and treatment is necessary then 1st treatment course initiated by secondary care.

Patient should only be transferred back to primary care with a treatment plan.

No

Assess need for treatment based on total serum 25-OHD level

25-OHD < 25nmol/L

Loading/ Treatment dose required (*)
1st line: Colecalciferol 20,000 IU capsule: 5 capsules a day for 3 days (total dose of 300,000 IU);
2nd line: Colecalciferol 20,000 IU capsule: 3 capsules (60,000 IU) weekly for 8-12 weeks.
3rd line: Colecalciferol 300,000 IU IM injection: single dose where oral therapy cannot be tolerated or concordance is poor.
4th Line: Ergocalciferol 300,000 IU IM injection: single dose where oral therapy cannot be tolerated or concordance is poor and colecalciferol injection is unavailable.

See Monitoring below
- Check Ca & Vitamin D levels after 8-12 weeks
- Has patient responded to treatment? - Consider non-compliance

No

Repeat loading dose
- Has patient responded to treatment?

Yes

No

Refer to appropriate specialist in secondary care

25-OHD 25 - 49nmol/L

Maintenance of 800-1000 IU/day (*)
(Doses of up to 2000 IU may be required)
- OTC high strength vitamin D preparation providing 800-2,000 IU/day + Lifestyle advice
OR
- Consider Adcal D3 or Calceos - 2 daily (containing 400 IU colecalciferol per tablet) for 65 and over due to evidence of reduced fall and fracture risk + Lifestyle advice

Routine monitoring of 25-OHD not necessary
Calcium levels may need to be checked 3-6 monthly in patients on doses higher than 1,000 IU/Day

25-OHD 50 - 75nmol/L

Lifestyle advice

MAINTENANCE
- Once 25-OHD levels are optimal give lifestyle advice and advise on maintenance treatment. See Maintenance box above.

MONITORING
- Check serum calcium levels 4 weekly and 25-OHD levels 8-12 weekly for patients on high (treatment) dose of vitamin D.

- Check for allergies (some products may contain peanut (arachis) oil, sunflower oil or soya oil.
- Alfacalcidol & calcitrol should only be used in patients who cannot activate vitamin D and should therefore not be used for the routine treatment of primary vitamin D deficiency/insufficiency, as they carry a higher risk of toxicity and require long-term monitoring.
- Patients should be advised of the symptoms of hypercalcaemia (nausea, abdominal pain, thirst, polyuria etc) and advised to stop taking vitamin D supplements and seek medical advice if these occur.
Investigation and treatment of Vitamin D deficiency / insufficiency in children

Is patient a child (<18 years of age) with one of the following (in the context of child’s age)?
- tetany
- reluctance to bear weight
- leg bowing or knock knees
- impaired linear growth
- skeletal deformity
- muscle pain or weakness
- bone pain
- proximal myopathy
- low serum calcium or high ALP

Vitamin D testing not required at this stage

Give appropriate lifestyle advice

Have other causes for symptoms been excluded?

No
- Refer to specialist in secondary care.
  - Where appropriate, consider commencing treatment in primary care until patient is seen by specialist (see below for treatment recommendations)
  - Patient should only be transferred back to primary care with a treatment plan

Yes
- If specialist advice/input deemed necessary in clinician’s judgement discuss with secondary care specialist and consider referral if indicated. If not treat in line with recommendations below

Carry out tests for suspected vitamin D deficiency: 25-OHD, Ca**, ALP, PO4, also U+E, LFTs, FBC. PTH is elevated in vitamin D deficient states but routine measurement not indicated.

Do any of the following apply?
- 25-OHD < 25nmol/L
- aged one year or under
- bone deformities (including rickets)
- malabsorption
- renal stones
- chronic renal disease, severe liver disease, lymphoma, metastatic cancer, parathyroid disorders, sarcoidosis, TB
- Atrialy biochemicaly (e.g. low vit D and hypercalcaemia)
- Pregnancy or breastfeeding

Yes
- Refer to specialist in secondary care.
  - Where appropriate, consider commencing treatment in primary care until patient is seen by specialist (see below for treatment recommendations)
  - Patient should only be transferred back to primary care with a treatment plan

No
- Assess need for treatment based on total serum 25-OHD level

25-OHD < 25nmol/L
- Refer to specialist but where appropriate consider commencing treatment in primary care until seen by specialist – see above (*)
  - Prescribe: PO colecalciferol 3000 IU/ml liquid
  - Doses as per BNF for children:
    - 1-6 months: 3,000 IU daily for 8-12 weeks
    - 6 months-12 years: 6,000 IU daily for 8-12 weeks
    - 12-18 years: 10,000 IU daily for 8-12 weeks

See Monitoring below
  - Check Ca & vitamin D levels after 8-12 weeks
  - Has patient responded to treatment?
    - Consider non-compliance

25-OHD 25 - 49nmol/L
- Nutritional supplement (*)
  - < 6 months: calciferol 200-400 IU daily
  - > 6 months: calciferol 400-800 IU daily

Available Products
- Healthy Start Vitamins [colecalciferol 300 IU per 5 drops]
- Abidec® (vitamins A, B, C, D) drops:
  - [0.6ml contains ergocalciferol 400 IU, vitamin A 1333 units]
- Dalivit® (vitamins A, B, C, D) drops:
  - [0.6ml contains ergocalciferol 400 IU, vitamin A 5000 units]

  + Give appropriate lifestyle advice

Routine monitoring of 25-OHD not necessary

25-OHD 50 - 75nmol/L
- Appropriate Lifestyle advice

25-OHD  > 75nmol/L
- Refer to appropriate specialist in secondary care

MONITORING
- Check serum calcium levels 4 weekly and 25-OHD levels 8-12 weekly for patients on high (treatment) dose of vitamin D

- Check for allergies (some products may contain peanut (arachis) oil, sunflower oil or soya oil.
- Alfacalcidol & calcitrol should only be used in patients who cannot activate vitamin D and should therefore not be used for the routine treatment of primary vitamin D deficiency/insufficiency, as they carry a higher risk of toxicity and require long-term monitoring.
- Advise of the symptoms of hypercalcaemia (nausea, abdominal pain, thirst, polyuria etc) and advise to stop vitamin D supplements and seek medical advice if these occur.