Reducing the risk of hypocalcaemia with parenteral antiresorptive therapies: an audit

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1. Introduction

Intravenous bisphosphonates and subcutaneous denosumab are potent antiresorptive agents widely used in the treatment of osteoporosis, Paget's disease and metastatic malignancy (1). Several case reports have identified the risk of life-threatening hypocalcaemia with these treatments (2-4), as highlighted by recent UKMHRA advice (5). Vitamin D deficiency contributes to this risk and it is recommended that supplements are given where necessary.

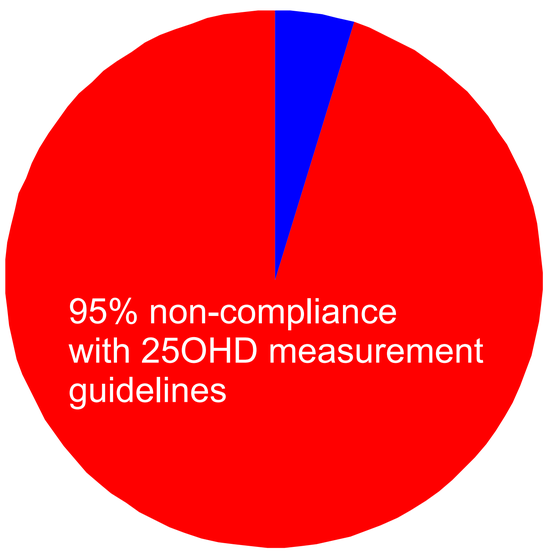
2. Local guidlines

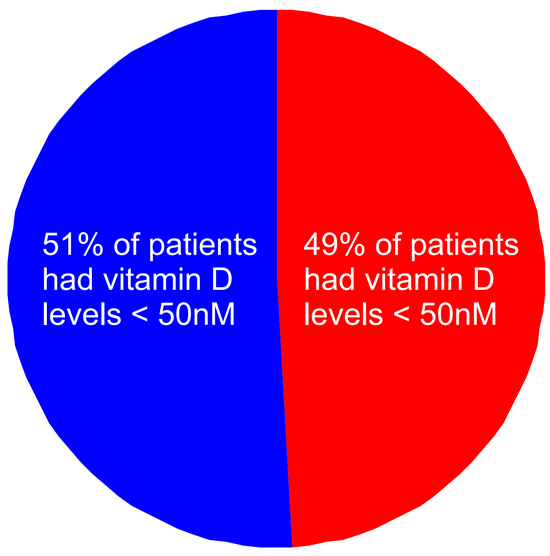
- All patients should be vitamin D replete (serum (25OH) vitamin D > 50nmol/L)

- Measurement interval depends on drug:
  Zoledronate & denosumab - within past 2 months of infusion.
  Other bisphosphonates - within past 12 months

- If 25OHD < 50 nmol/L - defer infusion and give vitamin D replacement in the form of Dekristol 100000 units (can all be taken at once, or staggered if preferred).

3. Result of first audit cycle





4. Change effectors

To optimise vitamin D status and decrease the risk of hypocalcaemia, a three-step approach was taken:

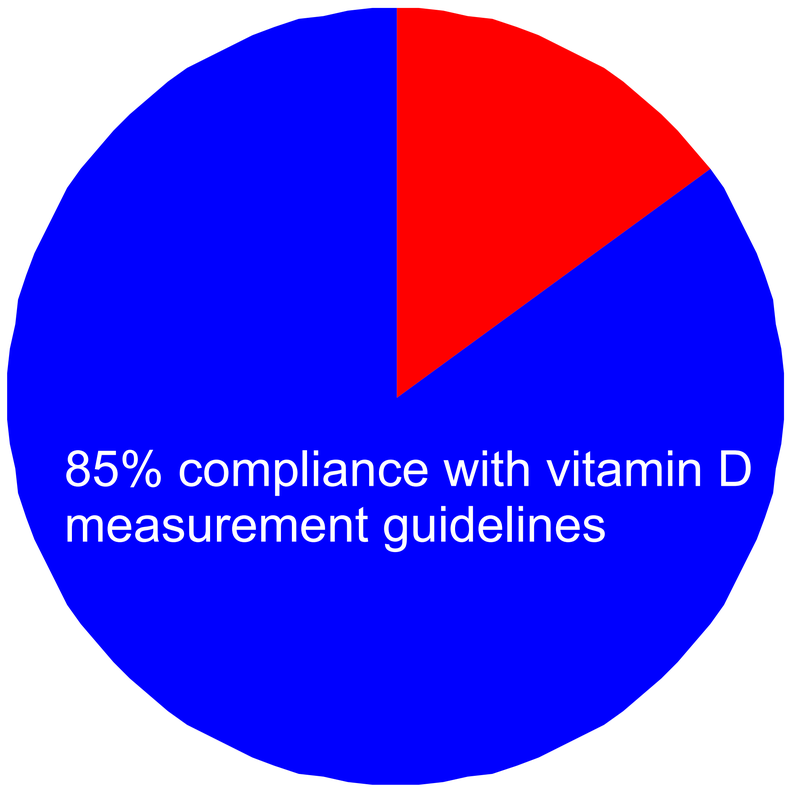
1. Clear written instructions provided to GPs to check serum 25(OH) vitamin D (25OHD) levels and start oral supplementation (colecalciferol 100,000 units total over 5 days) if 25OHD<50nmol/L.

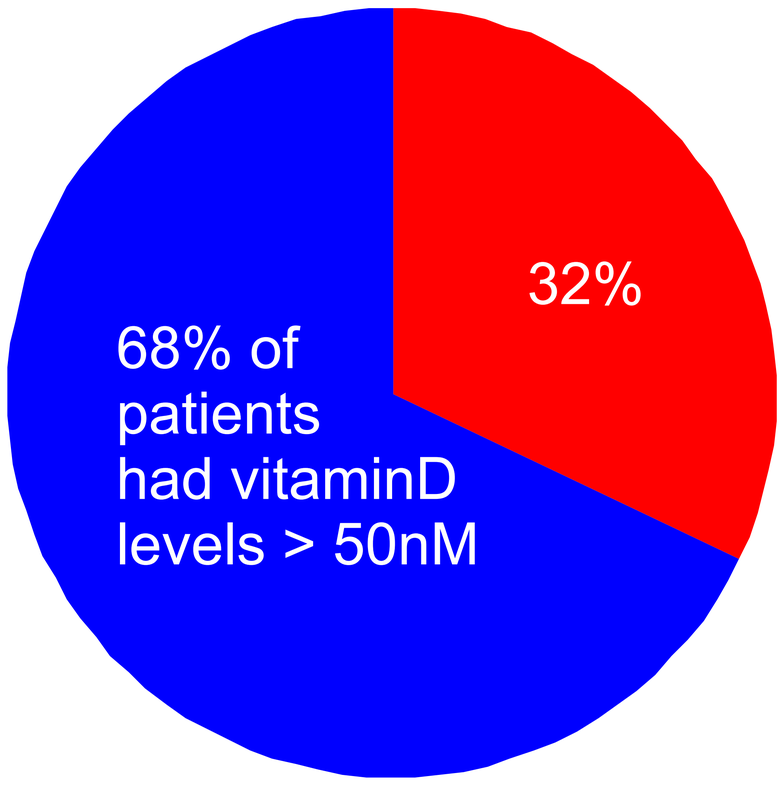
2. Provision of standard template for use by junior doctors and nurses with clear thresholds for 25OHD (>50nmol/L), corrected calcium (>2.00mmol/L) and renal function (eGFR>40ml/min/1.73m2 for zoledronate).

3. Treatment could only be given if these assessments were completed.

5. Result of second audit cycle

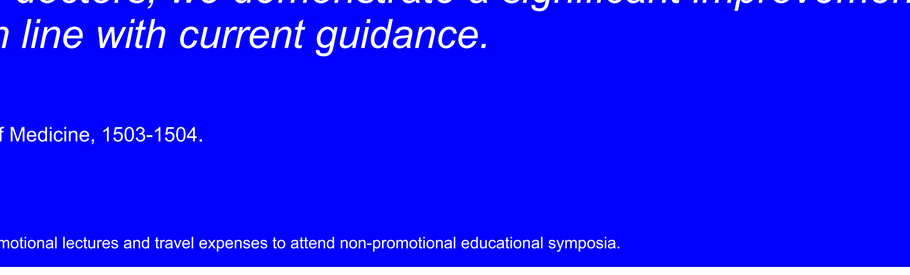
After the first audit, a standard of 85% compliance with guidelines was set as success threshold for the changes put in place. This compliance rate was achieved overall.





6. Comparison between audit cycles

Through the change effectors, we demonstrate an 80% improvement in the monitoring of 25OHD levels. Importantly, there was a 20% reduction in the number of patients with very low (<25 nmol/L) 25OHD levels.



7. Conclusion

Vitamin D deficiency was significantly reduced in our patient population, which may have been explained, partially, by season. However, by providing detailed information to GPs and structured templates to hospital junior doctors, we demonstrate a significant improvement in the monitoring of vitamin D levels and appropriate oral vitamin D supplementation in line with current guidance.

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Conflict of interest: Terry Aspray has received grant / research support from Glaxo Smith Kline and speaker fees from AMGEN for non-promotional lectures and travel expenses to attend non-promotional educational symposia.