NPPG
Neonatal & Paediatric Pharmacy Group

Position statement

Liquid Vitamin and Iron Supplements in Neonates and Children

Take Home Summary

- Liquid multivitamin preparations are widely used in neonates and children to support growth, development and general health.
- Liquid single-vitamin and iron preparations are also used to provide targeted supplementation in some cases.
- As well as providing routine supplementation for neonates and children who are fit and well, such products are also used to deliver tailored supplementation to patients with specialist needs, such as premature neonates and individuals with cystic fibrosis or cholestatic liver disease.
- A summary of liquid and chewable/soluble tablet multivitamin products available in the UK has been prepared by the NPPG Information Service, and is available here .
- The same resource also provides details of single ingredient Vitamin A and Vitamin E products, highlighting potential excipients of concern.
- Single ingredient Vitamin D products are not covered on the basis that there are a wide range of products available and as such there is likely to be an easily accessible alternative in the event of a supply issue with one or more of the available brands.
- The choice of product for a particular patient or cohort of patients is multifactorial, taking into account composition, clinical need, excipients, availability and cost.
- Consideration should also be given as to the licensing status of the available products. Some are licensed medicinal products, whereas others are classified as food supplements. Where the prescriber's intention is to treat or prevent a disease, or restore, correct or modify a physiological, metabolic or immunological function, a licensed medicine should be used in preference to a food supplement. However, where the intention is just to provide nutritional supplementation, a food supplement may be considered first-line.
- Not all vitamin and mineral preparations can be prescribed on FP10 prescriptions, creating challenges when hospital specialists request ongoing prescribing of supplements in Primary Care. The Drug Tariff details which products can be prescribed on FP10s, and for which conditions. Details of any Drug Tariff restrictions applying to particular products are also provided in the NPPG Information Service document linked above.
- Specific dosing recommendations according to clinical scenario are beyond the scope of this document, however general guidance is provided in the further information section. A pragmatic approach is often required, particularly during supply shortages.
- Where products are in short supply, it may be necessary to consider which patient groups are most likely to be affected, particularly by longer-term shortages. It may be necessary to prioritise use of particular products for certain patient cohorts.
- When switching between products, careful prescribing and communication with patients, their families and other healthcare professionals is necessary to avoid medication error.

Further Information

Excipients

When selecting an appropriate medicine for children, excipient content should also be considered; see the position statement *Choosing an oral liquid medicine for children* for further details. In addition, it should be noted that some vitamin preparations contain arachis oil, and so should be avoided or used with caution in patients with a known peanut allergy or intolerance. As many patients with soya allergies are also sensitive to peanuts, products containing arachis oil should also be used with caution or avoided in individuals sensitive to soya.

Further information continued

Cystic Fibrosis

Most patients with cystic fibrosis (CF) need fat soluble vitamin supplementation[1,2]. National consensus on first-line products and regimens is lacking, each centre having a slightly different approach. Initial dosing is often empirical, and subsequently adjusted based on blood levels of each vitamin. Patient factors such as the presence of pancreatic insufficiency and age often influence initial choice. Standard multivitamin products (e.g. Abidec or multivitamin tablets) may be suitable for patients who are pancreatic sufficient, whereas those with pancreatic insufficiency often need CF-specific formulations. It is often necessary to use products outside of manufacturers' recommended age ranges or doses in order to find an acceptable formulation for the patient and/or to achieve adequate blood vitamin levels. This is usually done with the input of a specialist CF dietician and CF pharmacist.

The need to adjust individual vitamin doses according to blood levels can often lead to the use of single vitamin supplement products alongside a multivitamin preparation in the same patient. It can be complex to achieve the optimal balance of each individual vitamin, with pragmatic decisions needing to be made, taking into account available formulations and patient preference. Adherence to medication regimens is a frequent challenge in CF. Offering patients a choice of formulations and the tailoring of regimens to limit the "pill burden", for example through alternate day dosing or use of escalated doses of multivitamin preparations, are important.

Where patients have pancreatic insufficiency, fat soluble vitamins should be taken at the same time as pancreatic enzyme treatments in order to maximise absorption[1,2].

Cholestatic Liver Disease

Fat soluble vitamin supplementation is usually necessary in cholestatic liver disease, unless the cholestasis is likely to resolve within a few weeks, in which case the patient's vitamin stores are likely to be sufficient. Water soluble vitamin absorption is unaffected by cholestasis, and so supplementation is rarely needed. Ideally fat soluble vitamins should be given with a meal to maximise any potential bile flow and thus improve absorption

Initial treatment regimens vary between centres, taking into account patient preference and age. Blood levels are usually checked a month after starting treatment, and subsequent adjustments made. Typical starting regimens use Dalivit®, supplemented with separate single Vitamin E, Vitamin K and Vitamin D products.

Phytomenadione has known benefits for bone health as well as clotting, and is the preferred vitamin K analogue. Although menadiol, a water soluble vitamin K analogue is theoretically preferable to phytomenadione in chlolestasis, the lack of a licensed liquid can be practically challenging. Where clotting tests particularly Internationalised Normal Ratio (INR) remain acceptable, use of phytomenadione may be appropriate, but otherwise menadiol should be considered.

Frequency of vitamin blood level monitoring will depend on the specialist liver centre and the frequency of patient review, but checking levels a month after a dose change, or 3-6 monthly if there has been no change would be typical. INR can be used as a surrogate for vitamin K sufficiency. In order to achieve adequate blood levels, patients with cholestatic liver disease frequently require doses of individual vitamins which are considerably higher than those recommended in medicines information resources and formularies. Use of intramuscular depot injections may also be considered where blood levels remain inadequate after escalation of oral doses.

Premature Neonates

Preterm infants have higher requirements for most vitamins due to low body stores, reduced absorption and immature enzyme transport systems[3]. Regimens vary from centre to centre, frequently taking into account whether the patient is being fed breast milk or formula feeds. A publication from the Neonatal Dietician group of the British Dietetic Association (BDA) recommends Abidec® as the first-line option for preterm and small for gestational age infants, also providing suggestions of alternative supplementation when Abidec® is unavailable[4].

Modification of the initial vitamin supplementation regimen can occur in response to factors including blood vitamin levels, the presence of cholestasis and the development of osteopenia of prematurity.

Licensing Considerations

Some vitamin and mineral products are licensed medicines, whereas others are classified as food supplements. The Human Medicines Regulations 2012 define a medicine as any substance/ combination of substances[5]:

- having properties for treating or preventing disease
- used for restoring, correcting or modifying a physiological, metabolic or immunological function
- administered to make a medical diagnosis

A food supplement is defined as "a concentrated source of a vitamin, mineral or other substance with a nutritional or physiological effect, alone or in combination, sold in dose form". Food supplements are made to different quality standards to medicines. Unlike medicines, nutrition law does not require manufacture to be compliant with Good Manufacturing Practice (GMP)[7].

Further Information continued.

Where the prescriber's intention is to treat or prevent a disease, or restore, correct or modify a physiological, metabolic or immunological function, a licensed medicine should be used in preference to a food supplement. If, however, the intention is just to provide nutritional supplementation, a food supplement may be used first-line.

Restrictions on Prescribing Vitamin or Mineral Supplements in Primary Care

NHS England Policy Guidance states that vitamin and mineral supplements should not be routinely prescribed in Primary Care, with the follow exceptions:

- when the patient has a medically diagnosed deficiency, including for those patients who may have a lifelong or chronic condition, or have undergone surgery that results in malabsorption. Continuing need should however be reviewed on a regular basis. Maintenance or preventative treatment is not an exception
- calcium and vitamin D for osteoporosis
- prescription-only vitamin D analogues such as alfacalcidol
- malnutrition including from alcoholism (see National Institute for Health and Care Excellence guidance)
- patients suitable to receive Healthy Start vitamins, which are available to women who are pregnant, breastfeeding or have a child under 1 year old; and children under the age of 4 (note: this is not on prescription but commissioned separately).

The Drug Tariff states that some food and toilet preparations have the characteristics of drugs in certain conditions. The Advisory Committee on Borderline Substances (ACBS) advises the NHS on the circumstances in which such substances may be regarded as drugs; these recommendations are provided in the Drug Tariff in the following lists:

- LIST A - This is an alphabetical index of products which the ACBS has recommended for the management of the conditions shown under each product.
- LIST B - This is a cross index listing clinical conditions and the products which the ACBS has approved for the management of those conditions. It is essential to consult LIST A for more precise guidance.
- LIST C - The products which have been considered by the ACBS and may not be prescribed on Form FP10, are now included in Part XVIIIA.

Where a Primary Care prescriptions is written in accordance with the ACBS lists, they should be endorsed "ACBS"

Key Paediatric ACBS indications include disease-related malnutrition, intractable malabsorption, growth failure, pre-operative preparation of malnourished patients, dysphagia, short bowel syndrome, bowel fistula. Not all paediatric patients with a good clinical reason for vitamin or supplementation on an ongoing basis will fall under the ACBS listed conditions, but prescribing may still be possible under the NHS England Policy Guidance linked above.

References

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2. Cystic Fibrosis Foundation. Vitamins. Accessed via: https://www.cff.org/managing-cf/vitamins on 01/05/2024.
3. Koletzko B, Poindexter B, Uauy R (eds): Nutritional Care of Preterm Infants: Scientific Basis and Practical Guidelines. World Rev Nutr Diet. Basel, Karger, 2014, vol 110, pp 152–166.
4. British Dietetic Association. The routine supplementation of vitamins and iron and the management of zinc deficiency in preterm and small for gestational age infants: A Guideline for Clinical Practice. January 2024.
5. Specialist Pharmacy Service. Explaining the licensed status of medicines. November 2003. Accessed via: https://www.sps.nhs.uk/articles/explaining-the-licensed-status-of-medicines/ on 01/05/2024.

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