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Severe Malnutrition - A Management Guideline

While some degree of malnutrition can be measured among children living in the poorest segment of any society, frank starvation is thankfully not a common problem in the general pediatric population of developed countries. Apart from rare cases of severe child abuse, the pediatrician will only see significant malnutrition amongst complex patients with chronic health problems. Examples include liver and renal failure, short gut syndromes, advanced cystic fibrosis, anorexia nervosa - the list is a long one. While nutrition is a major part of the management of such children their nutrition is very rarely at a level where the re-feeding syndrome becomes a likely problem. The following guidelines mainly apply to children living in utter poverty who are suffering from advanced malnutrition.

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The response to re-feeding in starved children depends on the degree and duration of the starvation plus a good contribution from individual variability. The end result is very hard to predict. If children have been starving for a month then a re-feeding plan is necessary. It will be overkill for most of them but will prevent the tragedy of a child dying from our well intentioned treatment. If they have been hungry for a week then just feed them.

Re-feeding syndrome is a real entity. It doesn't affect all children but sudden unexpected death is certainly a significant risk if starved children are suddenly filled with rich food. Many explanations have been given but the exact answer is not understood. The real answer is that there isn't a single cause of death - it's the end result of many pathways (thiamine deficiency, sepsis, pneumonia, hypoglycemia, hypothermia etc). That doesn't mean it is untreatable. Long experience has shown that careful management of the starved child, based on a clear understanding of the problem, has a low mortality.

The principal problems in a child presenting with severe chronic malnutrition are:

- Dehydration; DO NOT re-hydrate by i.v. route. It is dangerous and asking for trouble. Use the oral route in everyone unless they are unconscious.
- Hypothermia.
- Infection (pneumonia or septicemia with no focus).
- Electrolyte disorders (hypoglycemia is the most important but also K, Ca and PO4).
- Micronutrient disorders (B group vitamins - particularly thiamine, vitamin C and Vitamin A, zinc and iron). However, be careful with iron because early institution (before 1 week) is associated with a higher death rate - possibly due to increased risk of sepsis.

Management priorities:

- Take the time to learn about the problem first so you can decide whether a re-feeding protocol is even necessary. History must include immunisations, age, past medical problems (particularly TB, malaria and gastroenteritis). Basic examination should include; weight, height (plot against age on up to date WHO growth charts, including z score - you can find them on the web). Check temperature; look for signs of dehydration and pneumonia.
- Minimum investigations for a sick child include rapid glucose stix, CXR, blood cultures, CBC, electrolytes, urine screen, thin and thick malarial smears. When better place a TB skin test and check urine plus stool for O and P.
- If hypothermic and/or lethargic assume the child is septic and start i.v. antibiotics (cloxacillin/cefotaxime). If alert, then cultures only. Re-warm slowly.
- Start oral rehydration solution ad lib in all but the most severely lethargic. In the sickest, I still prefer to use the nasogastric route rather than i.v.
- Have a standard vitamin/electrolyte protocol ready. The following will do:

  - Zinc 1 mg/kg p.o. daily for a week.
  - Vitamin K 5 mg p.o. daily for a week - longer if bruising present.
  - Vitamin A (probably the most important of them all). 100,000 units p.o. < 1 year. 200,000 units p.o. > 1 year.
  - Folic acid 5 mg p.o. daily for months.

- Iron (not before 1 week and not i.m.) 5 mg/kg elemental iron p.o. daily for months.
- Thiamine 1 mg/kg p.o. daily for a week.
- Multivit tablet daily for months.

- On day 2, introduce formula feed slowly. Build up to full feeds no faster than 1 week. After that the child is over the worst.
- Malnutrition does not occur on its own. Be aware of the high likelihood that there will be some children with other problems such as severe dermatitis, trachoma, various G.I parasites, lice, etc.

For more detailed information, please refer to the textbook *'Manual of Tropical Pediatrics', M D Seear, Cambridge University Press, 2000.*