Chapter 12
The Nutritional System and Acid–Base Balance

The commonest disorder of nutrition in the developed world is obesity due to excessive food intake, and it is now held to affect one in five of the population. In the rest of the world it is malnutrition due to an insufficient supply of food. Vitamin deficiency is, however, seen in all localities due to poverty and is, in some areas, becoming particularly more common in the elderly. In hospital, deficiencies and disorders due to problems with body water, electrolyte and acid–base balance in those patients on treatment, is of increasing importance.

Diagnosis of disorder will depend on symptoms, history, observation of the patient and examination of:

(A) body weight,
(B) blood tests,
(C) X-rays,
(D) urine tests,
(E) fluid input–output measurement.

Common symptoms of generalized disorder will be:

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Differential Diagnosis

(1) fatigue, weakness and malaise,
(2) breathlessness (exertional),
(3) skin rashes,
(4) oedema,
(5) anaemia,
(6) growth deficiency,
(7) orthopaedic disorders (e.g. osteoporosis/arthritis).

(A) Body Weight

A patient is considered overweight if weighing over 20 lb (8 kg) more than the norm for age, sex, height and body build. Tables (see page 61) published by life insurance companies offer guides for adult norms. Fat normally constitutes 20% of total body weight, and skinfold thickness can also be assessed (greater than 23 mm, male; or 30 mm female, over the triceps in the upper arm). The diagnosis of obesity or gross undernutrition is, however, frequently obvious in the initial assessment of the patient’s physique.

(B) Blood Tests

In vitamin deficiency and malnutrition anaemia is common. Full blood film, count and serum assessments will be necessary. In acid–base balance monitoring blood gases, arterial and venous tests are necessary, as well as the electrolyte status.

(C) X-Rays

Osteoporosis or osteomalacia is assessed by X-ray, as is age in the underdeveloped or malnourished child, by defining ossification centre activity.

(D) Urine Tests

Saturation tests for vitamin C absorption, or the detection of excess calcium salts, may be employed. Urine measurement and output and its concentration (specific gravity) in maintaining acid–base balance, is essential. Urea and acetone content of urine in starvation is a useful guide to diagnosis.