Clinical Examination of a Post-bariatric Surgery Patient

6

Sarfaraz Baig, Pallawi Priya, and Manjari Agarwal

Listen to your patient. He is telling you the diagnosis!

—William Osler

6.1 Introduction

Bariatrics is an evolving science and by nature of the surgery itself, patients are at risk of developing several nutritional, metabolic and psychosocial problems. Most of them, if not caught and treated on time, may have the potential to lead to irreversible damage [1, 2]. Hence, early diagnosis is of paramount importance.

Outpatient follow-ups are a great opportunity to closely examine the patient. A thorough history and physical examination can help us to diagnose most complications in their early stages.

Although there are guidelines available on how to examine patients before and after bariatric surgery [3], the need for a protocol-based clinical pathway remains unfulfilled. The purpose of this chapter is to provide a sample protocol for the clinical evaluation of a patient who has undergone bariatric/metabolic surgery. The purpose of such an evaluation is to assess the response to surgery and look for signs of any nutritional, metabolic or psychosocial issues.

The clinical evaluation comprises of history, examination, and laboratory tests. The following provides a general overview of the history and examination of a bariatric patient. Laboratory tests have been covered in another chapter and therefore, will not be discussed here.

S. Baig (✉) · M. Agarwal
Department of GI and Minimal Access Surgery, Belle Vue Clinic, Kolkata, West Bengal, India

P. Priya
Metabolic and Bariatric Surgery, Belle Vue Clinic, Kolkata, West Bengal, India

A. G. Bhasker et al. (eds.), *Management of Nutritional and Metabolic Complications of Bariatric Surgery*,
https://doi.org/10.1007/978-981-33-4702-1_6

6.2 History

History of a patient before bariatric and metabolic surgery (BMS) focuses on the evaluation of eating behaviour, motivation for a lifestyle change, associated comorbidities, weight loss attempts, substance abuse and activity levels. In comparison, evaluation after surgery focuses on weight loss, adaptation to new diet and lifestyle, gastrointestinal symptoms, symptoms of nutritional deficiencies/metabolic complications, changes in effect as well as changes in pre-existing comorbidities.

Table 6.1 describes the salient points in history taking in a patient after bariatric surgery.

History starts by noting the weight loss of the patient. Weight loss, if more than expected, can be a warning signal regarding possible protein–energy malnutrition (PEM). This is particularly important in case of malabsorptive procedures like OAGB, BPD-DS and SADI-S.

Table 6.1 Salient points in history taking of bariatric patients

Diet		
Food recall	Food diary/24 or 72-h recall	Assessment of nutritional adequacy of diet Assessment of eating patterns
Food tolerance		Intolerance to supplements, especially protein supplements and meat may be problematic
Eating disorders	Binge eating/ grazing/ loss of control	Continued psychological counselling may be needed to overcome eating disorders which may prevent achievement of the lifestyle and weight loss goals
Surgical problems		
Wounds	Healing/discharge/lump	
GI symptoms	Nausea/vomiting/reflux/dumping/ diarrhoea/steatorrhoea/anorexia	
Comorbidities		
	History of change in medication requirement, well-being, and achievement of near-physiological parameters	Comment on no change, resolution, remission, relapse
Social		
Stress	Stress producing factors which may come in the way of lifestyle goals	
Knowledge	Problems with food preparation/ cultural or social misconceptions	
Financial	Problems with the purchase of required food, supplements	
Others		
Substance abuse	Smoking/alcohol/other addictions	
Activity	Activity level	
Mood		

Dietary history starts with a recall that indicates the quality and quantity of food intake with special emphasis on protein intake. Patients are asked if they are eating quickly or taking water with food. Any food intolerances are noted. Frequently, bariatric patients may have meat or lactose intolerance that may hamper the protein intake. Binge eating, grazing, mindless eating and emotional eating are assessed preferably by the psychologist. Sometimes, the relatives of the patient may help to answer these questions as some patients lack insight into their own behaviour.

Many comorbidities improve after surgery leading to a change in medications. For example, many patients will be off medications for diabetes immediately after surgery. Some may require a reduction of medications. It is important to note the blood glucose trends after surgery so that the physician can appropriately titrate the dose of anti-diabetic medications. Diseases such as dyslipidaemia, chronic liver disease, chronic renal disease, obstructive sleep apnea, cardiac conditions and arthritis may also need a change in the treatment protocol. History should be focused on the same. We ask the patients to maintain a chart of their comorbidity-related manifestations (fasting blood glucose, blood pressure, pain, reflux) to make the necessary adjustments in medications.

There is literature to suggest that addictions or substance abuse may increase after bariatric surgery [4]. Hence, it is important to note the consumption of alcohol and status of other addictions after surgery. There is increasing awareness regarding food addiction, especially sugar-sweetened beverages (SSBs) and should be looked for. Behaviour is one of the most important reasons for weight regain and therefore incorporating a psychologist in the team may go a long way in assessing and managing the patient.

Some studies have noted a higher incidence of suicides in bariatric patients [5]. Hence, the assessment of mental health is important. Patients who have a pre-existing history of depression, anxiety and other mental health issues should be monitored more closely. Psychologists and psychiatrists should be a part of a bariatric team and their help should be sought whenever appropriate.

People who routinely do some physical activity have been found to experience less weight regain [6] compared to sedentary people. It is important to encourage exercise, sports and other physical activities with the understanding that different patients have different levels of performance.

Some patients may complain of various gastrointestinal symptoms. Many of them may signify a problem that needs early evaluation and intervention.

Table 6.2 on signs and symptoms of deficiencies of micronutrients is useful to remember and gives an overview of what to look for specifically in a patient from the nutritional perspective after bariatric surgery.

Table 6.3 provides a list of symptoms to be asked for and their potential causes. From a clinical application point of view, Table 6.3 is more important than Table 6.2. It is important to understand what issue a particular symptom represents rather than learning the deficiency signs alone.

Nausea and vomiting are common post-operative issues in gastrointestinal surgery. It is of special importance in bariatrics, as prolonged and untreated vomiting

Table 6.2 Symptoms of various nutritional deficiencies after bariatric surgery

Thiamine (B1)	Neuropsychiatric: aggression, hallucination, confusion, ataxia, nystagmus, paralysis of motor nerves of eyes
Riboflavin (B2)	Anaemia, dermatitis, stomatitis, glossitis
Niacin (B3)	Diarrhoea, confusion, dermatitis, ataxia
Pantothenic acid (B5)	Depression, infections, orthostatic hypotension, paraesthesia, foot drop, gait disorders
Pyridoxine (B6)	Dermatitis, neuropathy, confusion
Folic acid (B9)	Weakness, weight loss, anorexia
Cobalamine (B12)	Depression, malaise, ataxia, paraesthesia
Ascorbic acid (C)	Malaise, myalgia, gum disease, petechiae
Biotin (B7)	Loss of taste, seizure, hypotonia, ataxia, dermatitis, hair loss
Vitamin A	Night blindness, itching, dry hair
Vitamin D and calcium	Arthralgias, depression, fasciculation, myalgia
Vitamin E	Anaemia, ataxia, motor speech disorder, muscle weakness
Vitamin K	Bleeding disorder
Iron	Fatigue, shortness of breath, chest pain, anaemia, hair loss, koilonychia
Zinc	Skin lesions, nail dystrophy, alopecia, glossitis
Copper	Anaemia
Selenium	Dyspnea, fatigue, leg swelling, cardiomyopathy

Table 6.3 Clinical significance of common symptoms after bariatric surgery

Symptoms	Significance
Nausea/vomiting	Poor eating behaviour, nutritional deficiencies, surgical complications (stenosis/internal hernia/ulcer/reflux)
Diarrhoea	Malabsorption, SIBO (small intestinal bacterial growth), dumping
Steatorrhoea	Malabsorption, poor dietary choice
Bloating	Poor food choice, obstruction
Black stools	Stapler line bleed, anastomotic ulcer
Abdominal pain	Stones, ulcers, obstruction, internal hernia
Heartburn and reflux	May induce anorexia, check for consumption of smoking/alcohol
Giddiness and falls	Dehydration, nutritional deficiencies, neuropathy, dumping, postural hypotension, hypoglycemia
Constipation	Lack of dietary fibre
Hair loss	Nutritional deficiencies (protein, iron, zinc, Biotin, EFA)
Taste alteration	Biotin
Weakness	Exclude dehydration, dumping, anaemia, autonomic deficiency, micronutrient deficiency, psychological reasons, protein–energy malnutrition and neurological cause (DAMPEN—see below)
Dribbling of saliva/ double vision/gait issues/ paraesthesia	Neuropathy—deficiencies of Thiamine, copper, B12, Guillain-Barre syndrome
Knee/back and ankle pain	Osteopenia, vitamin D and calcium

may lead to potentially serious complications. Untreated, it can precipitate dehydration, acute renal failure, thiamine deficiency and neuropathy. Effort should be made to ascertain if this is due to surgical complications such as stenosis or obstruction. The quantity and nature of vomitus, eating behaviour (eating too fast, overeating, inadequate chewing, eating and drinking together) and the precipitating factor may point to the aetiology.

Reflux may be a pre-existing problem or can develop de novo after surgery. It has been commonly associated with fried food, caffeine, smoking, alcohol and inadequate chewing. Higher incidence of reflux has been reported with sleeve gastrectomy [7]. Reflux can be distressing and influences eating behaviour and therefore, weight loss. It is important to elicit this history and plan treatment for the same.

Patients may develop diarrhoea or steatorrhoea after bariatric surgery. History on the quality of stools should identify and differentiate between the two since the implications and management of the two are different (Fig. 6.1). Prompt addressal is crucial to prevent nutrition and electrolyte disturbances. Constipation is also seen

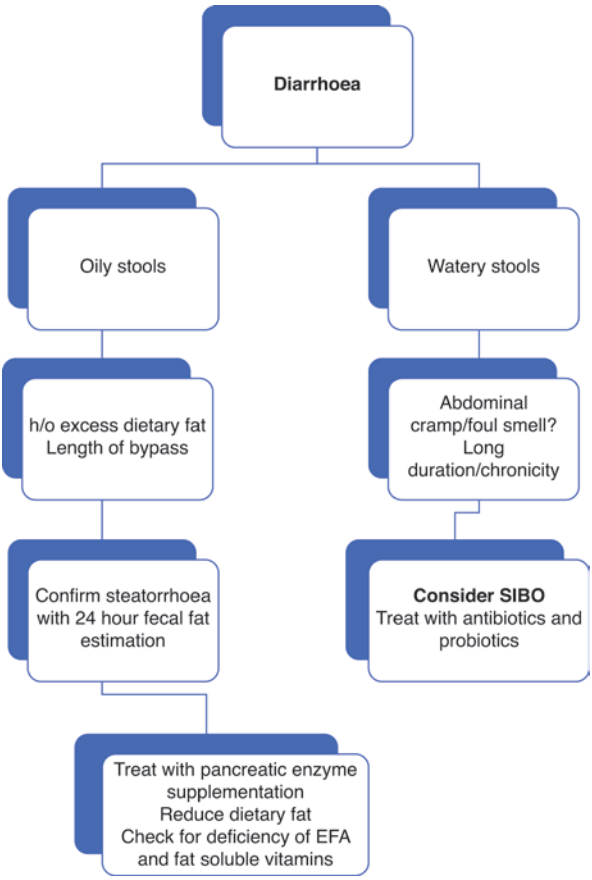

Fig. 6.1 Evaluation of diarrhoea in a post-bariatric patient

frequently and may be due to lack of fibre in diet or nutritional deficiencies such as vitamin D and Thiamine.

Giddiness can be because of dumping syndrome, orthostatic intolerance, dehydration or malnutrition. Careful history regarding the precipitating factors (food, position or decreased water intake) may indicate the cause of the symptom. If the symptom is precipitated by high carbohydrate food, dumping syndrome is a strong possibility. If it is brought about by standing from a lying down position, orthostatic intolerance should be suspected.

Other neurological symptoms such as double vision, abnormal gait, paraesthesia, dribbling of saliva, stuttering speech and confusion may indicate an impending neurological complication. Early diagnosis and treatment make a huge difference to the outcome as with time some neurological damages become irreversible. The timing of the neurological symptoms guides to the diagnosis. Early presentations are usually due to pressure on the nerves during surgery. Meralgia paresthetica is an example of the same. Wernicke's encephalopathy and Beri-Beri are also seen in the early post-operative course since thiamine is not stored in the body and a history of early non-responsive emesis is usually present in these cases. Guillain-Barre-like syndrome may also occur that present with paraparesis. Late neurological complications are usually due to deficiencies of copper, vitamin B12, vitamin E and folate.

Abdominal pain may be mild to severe and should not be neglected. This may be due to gallstones, kidney stones, ulcers, intestinal obstruction and internal hernia. The last two are seen in procedures involving infra colic compartment. A high index of suspicion should be present to detect internal hernia in time to prevent catastrophic complications.

Hair loss is common after bariatric surgery. It may be very distressing to the patient, especially if prior counselling was not adequate. The nutritionist should have a detailed dietary history from these patients and must be sure regarding the compliance to supplementation. Patients who present in the first year after surgery should be reassured regarding its self-limiting course.

Back and hip pain are common and these non-specific complaints in the patients with obesity and those after bariatric surgery are easily overlooked. Clinicians need to differentiate between back pain due to bad posture versus a back pain due to vertebral collapse/fracture. The latter is an indication of bone loss and is usually a silent complication with some patients presenting suddenly with hip and spine fractures [8]. Identifying symptoms of cord compression—problems in evacuating urine and stool—is important to identify the critical patients.

Weakness is a very important symptom and at some point in time, many patients complain about it after having bariatric surgery. They may call it "weakness", "fatigue" or "not feeling well". It is important to take a detailed history to exclude an organic cause. We use the mnemonic "DAMPEN" in our centre to remember the causes and to ask relevant questions to ascertain it.

- **D**ehydration
- **D**umping
- **A**naemia
- **A**utonomic insufficiency

- **M**icronutrient deficiency
- **P**sychological
- **P**rotein–**E**nergy malnutrition
- **N**eurological

With any bariatric surgery, food intake becomes drastically low and raises doubts in the patient and their family members about the adequacy of nutritional fulfilment. These patients may sometimes complain of weakness, which may be psychological and need reassurance.

Somatic neuropathy is a significant cause of weakness. The typical history is of post-surgery emesis that led to weakness, dribbling of saliva, poor gait and double vision.

Autonomic insufficiency [9] is increasingly recognized as a potential cause of orthostatic intolerance in patients after bariatric surgery, which is interpreted as weakness. These patients also complain of giddiness on standing up from a sitting position.

Many patients with dumping syndrome who experience post-prandial giddiness report it as weakness. Elaboration of the symptoms brought on by sugary food/drinks, can clarify the diagnosis in these cases.

Deficiencies such as vitamin D, iron, folate and B12 are also important nutritional causes of weakness that need clinical and laboratory evaluations for confirmation.

It is recommended that each centre creates its own checklists and protocols to make a note of these points. Tables 6.1 and 6.3 are the standard proformas followed at our centre.

6.2.1 Scoring Systems

Although not a part of any guidelines, scoring systems help track the outcomes in an objective way. BAROS, BQLI, and GIQLI are commonly used scoring systems to assess the outcomes of bariatric surgery. We suggest that any of these scores be used routinely for ease of audit, outcome assessment and comparison. In addition, pre-operative scores like ABCD and DiaRem may help in the assessment of comorbidity resolution.

6.3 Examination

The purpose of the examination of post-bariatric surgery patients is to know the response to the surgery and to find out any postsurgical complications. While BMI and anthropometry are important at each follow-up, a complete head-to-toe examination as well as a complete systemic examination is essential and should not be omitted. Table 6.4 gives a comprehensive view of the examination of a post-bariatric patient.

Table 6.4 Points to note in clinical examination of a post-bariatric patient

Anthropometry		
Height		
Weight		
BMI		
Waist circumference		
Hip circumference		
WHR		
BCA (Body composition analysis)		
Head-to-toe examination		
Examination	*To look for*	*Significance*
Hair	Texture, alopecia	May indicate deficiencies of protein, iron, zinc, EFA
Eyes	Xerophthalmia Bitot's spots	Vitamin A deficiency
Tongue	Glossitis Angular cheilitis	May indicate deficiencies of B complex vitamins
Gums	Ulcers Bleeding	
Oral mucosa	Aphthous ulcers Aphthous stomatitis	B complex deficiency
Nails	Brittle nails Koilonychia Poikilonychia	Iron deficiency
Skin	Acanthosis Hyperkeratosis plantaris Striae Intertrigo Chicken skin Xerosis Phrynoderma Acrodermatitis enteropathica Leg ulcers and abscesses Hyperpigmentation Necrotic dermatitis Erythema nodosum like lesions	These may be pre-existent in a patient suffering from obesity May indicate deficiencies of B12, A, D, C, zinc, selenium, iron Altered skin immunity with deposition of immune complexes
Limbs	Oedema Phrynoderma Lipodermatosclerosis	Protein, selenium deficiency May indicate deficiencies of vitamin A, B complex, E, EFA
Cardiovascular examination		
Heart sounds		
Orthostatic hypotension		Autonomic insufficiency
Neurological examination		
Sensations—touch, vibration, proprioception Motor power Tendon jerks Eye movements		Neuropathy (deficiency of B12, B1, copper), Guillain-Barre syndrome

Table 6.4 (continued)

Abdomen		
Skin redundancy		May indicate the need for abdominoplasty. Can interfere with gait
Hepatomegaly		
Splenomegaly		May indicate portal hypertension
Ascites		Can indicate worsening liver disease, malnutrition

Anthropometric evaluation requires a measuring tape and a weighing scale suitable for obese patients. For measuring the waist-hip ratio, it is important to note that the waist is measured at the midpoint between the lower margin of the last palpable ribs and top of the iliac crest and the hip is measured around the widest portion of the buttocks.

Body composition analyser is a good add-on to assess the fat, muscle and skeletal mass of the patient. These may be helpful for prognostication and comparison during follow-up. Fat loss is more important to assess than weight loss since muscle loss is a disadvantage after bariatric surgery—also known as sarcopenia. Sarcopenic obesity is known to increase after bariatric surgery and carries higher morbidity and mortality [10]. Preservation of fat-free mass has also been shown to be beneficial in preventing weight regain [11]. Therefore, it is important to know the ratio of fat loss vs muscle loss after BMS as a part of the follow-up and fat-free mass loss, which is excessive or protracted. Dagan et al. [12] studied patients who underwent sleeve gastrectomy and showed progressive fat-free mass loss after the first 6 months (following which it stabilizes) should warn the clinician to take action. Bariatric centres should have a Body Composition Analysis (BCA) machine and measure fat mass and fat-free mass and not rely entirely on body weight as an outcome parameter.

Having a plan for doing a general examination helps. We prefer going from head to toe to keep from missing any important findings.

We look for alopecia in the scalp. Some authors have reported impetigo-like lesions in the scalp [13] that may signify malnutrition.

Eyes are inspected for xerophthalmia and Bitot's spots that indicate vitamin A deficiency. Oral cavity examination may show glossitis, cheilitis, stomatitis, aphthous ulcers all of which may signify vitamin B deficiencies. Nails may show brittleness, ridges, spoon shape and may indicate iron deficiency. Face and neck are examined for skin lesions such as acanthosis.

Upper limb examination involves examination of nails, looking for skin lesions and blood pressure measurement. Blood pressure should be measured both in the erect and supine position to pick up orthostatic intolerance. Enough time should be given before measuring blood pressure at these positions to allow for hemodynamic equilibrium.

Examination of legs can give valuable information. Many patients with obesity have oedema that may be due to weight-related poor circulation, right heart failure or protein deficiency. Lipodermatosclerosis is a specific condition seen typically in patients with obesity due to venous hypertension and stasis. There is a combination

of swelling, pigmentation and induration of legs and is frequently misunderstood as cellulitis. Usually, with bariatric surgery, this condition resolves and it should be noted in the follow-up visits. Deep venous thrombosis (DVT) is a sinister complication and may present with calf swelling and tenderness.

Nutritional deficiencies produce an array of skin lesions and a general dermatological examination offers an excellent opportunity to detect these. The common skin lesions that have been reported in the literature are xerosis, phrynoderma, acanthosis, acrodermatitis enteropathica, leg ulcers and abscesses, hyperpigmentation, necrotic dermatitis and erythema nodosum-like lesions. The last two are manifestations of altered skin immunity. Figures 6.2, 6.3, 6.4 and 6.5 show examples of various skin lesions that may present after bariatric surgery.

It is important for clinicians dealing with post bariatric surgery patients to examine all parts of the body and diagnose these skin lesions. It is also crucial to have complete exposure on examination since skin lesions such as phrynoderma are hidden behind the elbows.

There are many skin lesions that are present in patients with obesity and it is vital to know them and not confuse them with post-bariatric dermatological complications.

Fig. 6.2 Lipodermatosclerosis

Fig. 6.3 Xerosis

They are acanthosis, hyperkeratosis plantaris, striae, intertrigo and chicken skin. Amongst these, acanthosis usually improves after bariatric surgery in the majority.

Psoriasis, a skin disease, has been shown to be associated with obesity [14] and most patients show resolution of these lesions after surgery although some aggravation has also been reported [15]. It is useful to remember that zinc deficiency can lead to skin eruptions in the form of psoriasiform dermatitis [16]. As we can appreciate, a bariatrician needs to diagnose a wide array of skin lesions and seek the help of a dermatologist wherever necessary.

Abdomen is checked superficially for any port site hernias, pre-existing paraumbilical and incisional hernia, intertrigo, lower abdominal cellulitis and distended abdominal veins. Deep palpation is done to detect any hepatomegaly, splenomegaly or tenderness. Many of these findings pre-exist in patients with obesity undergoing bariatric surgery and should be observed for resolution or non-response.

The respiratory system is assessed by noting the rate of breathing, orthopnea and lung sounds. Many post bariatric surgery patients have obstructive sleep apnea preoperatively and their assessment should be a part of examination at each visit. These patients are also prone to pneumonia and pulmonary embolism, something that can be picked up by chest auscultation.

Fig. 6.4 Acanthosis nigricans

Fig. 6.5 Iron stains in teeth

The awareness for neurological examination needs to be stressed. There is increasing evidence suggesting that the neurological complications after bariatric surgery are not as uncommon as thought earlier [17]. The examination should involve evaluation of mental status, sensorimotor functions, position and vibration sense and eye movements to pick up optic neuropathy, encephalopathy, radiculopathy, myelopathy, peripheral neuropathy, and myopathy. This also implies that the kit to perform a neurological examination should be available in the bariatric OPD. Picking up the subtle signs and early referral/treatment should be the goal rather than waiting for full-blown neuropathies that take weeks to months to reverse, with frequent permanent residual damages.

Key Points

- *Follow-up visits are the appropriate station for picking up post-bariatric nutritional and metabolic problems. A clinician (bariatric surgeon, nutritionist, psychologist, and a physician) must have the necessary knowledge to enable him or her to look for the relevant symptoms and signs.*
- *Clinical evaluation should include detailed history regarding weight loss, comorbidity resolution, gastrointestinal symptoms, neurological symptoms, pain and weakness. Examination should be head to toe. Anthropometric examination should include body composition analysis. Blood pressure measurement should be in both supine and erect positions. Neurological examination should include a complete sensorimotor and cranial nerve evaluation. Therefore, a neurological examination kit should always be available in a bariatric clinic.*
- *Many problems cannot be confirmed biochemically in the lab, therefore the importance of clinical examination cannot be overemphasized.*
- *Complications can be prevented if we can pick up and treat the subtle signs before their full-blown clinical state sets in. Centres should have their own standard checklists for clinical evaluation.*
- *Rarely, some cases of neuropathy, refractory anaemia, fractures, leg drop, cardiomyopathy, liver failure, skin lesions, pigmentation, psychiatric disturbances remain unexplained signifying the lack of knowledge on the subject. A complete clinical evaluation and documentation should be the appropriate starting point to take this science forward.*

Case Examples

Case 1a

A 22-year-old girl with BMI 48 and no other coexisting comorbidities apart from a feeling of low self-esteem, presents 6 months after bariatric surgery with hair loss from the scalp that is very worrisome to her. How would you approach the case? (Fig. 6.6).

Answer

- *Reassurance*
- *Ensure compliance to diet and supplements*

Fig. 6.6 Alopecia

Comments

Alopecia after bariatric surgery is common and parallels the weight loss curve. It is usually observed between 3 and 9 months after surgery following which the hair fall usually stops and returns to normal within months.

However, it is important to ensure compliance with a high protein diet and nutritional supplements during this period.

Case 1b

The same patient returns at 2 years with persistent alopecia. What will you do now?

Answer

Ask for

1. *Dietary recall*
2. *Compliance with supplements*

Check

1. *Albumin*
2. *Iron, ferritin, transferrin, TSAT*
3. *Zinc*

Give

1. *Iron and zinc supplements*
2. *Protein supplements—whey/casein*
3. *Essential fatty acids—nuts/supplements*

Comments

Alopecia at 2 years is a matter of concern. Patients are distressed and are unhappy with the situation. Protein and iron deficiencies are the commonest known

causes of the condition. Evidence in the literature suggests that there is an association between low iron+zinc levels with alopecia but not with individual levels [16].

Biotin, though a popular supplement used for the condition, does not have any convincing evidence in its favour [17].

Prevention seems to be the most important management strategy. Ensuring compliance with a good diet and supplements, especially in the initial phase of follow-up after bariatric surgery is vital.

Case 2

A 45-year-old lady with a history of RYGB done 7 years ago presented with a sudden onset back pain after having to lift a vacuum cleaner from her closet. AP and lateral radiographs advised by the family physician showed a compressed fracture at L2 (Fig. 6.7). On asking further, she gave the history of stopping her multivitamin supplements after taking them irregularly for 3 years.

How would you approach the case?

Answer

The differential diagnoses are:

1. *Bone loss secondary to vitamin D and calcium deficiency*
2. Spinal disease such as *Tuberculosis*

Check

1. *Urinary calcium*
2. *Serum Vitamin D*
3. *Alkaline phosphatase*
4. *Serum PTH*
5. *DEXA scan*

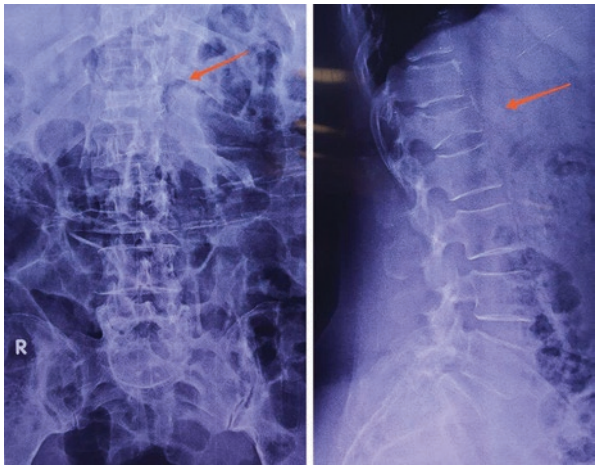

Fig. 6.7 Compression fracture due to osteoporosis (Pic credits: Dr. Keshav Goel, Sr. Consultant, Dept. of Orthopaedics, Park Hospital Karnal)

Bone density test revealed a spine T score of −2.63 and hip T score of −2.09. Serum PTH levels, urinary calcium levels and bone alkaline phosphatase were raised. Serum vitamin D was 4.63 ng/dL.

What is the diagnosis?

Answer

It is an osteoporotic fracture secondary to calcium and vitamin D deficiency compounded by perimenopausal status and non-compliance to recommended supplementation.

Would you do serum calcium levels?

Answer

Serum calcium level, although an indicator, is a poor indicator of total body calcium and a poor predictor of bone health.

How would you treat this patient?

Answer

Orthopaedic referral

Vitamin D supplementation up to 6000 IU/day, or 50,000 IU 1–3 times a week till levels become normal.

1200–1500 mg/day of calcium supplementation

Case 3

A 60-year-old gentleman who had a BPD-DS done 2.5 years ago presents in the OPD. He has lost 80 kg from his preoperative 150 kg weight and is still losing (Fig. 6.8). The nutritionist had seen him at 2 years and was happy with the progress and the fact that he had reached his ideal body weight. At 2.5 years, he presented to the clinic with weakness, inability to walk, swollen legs, exertional breathlessness and passing foul-smelling, oily stools. How would you approach the case?

Answer

This is a case of protein–energy malnutrition post-bariatric surgery. The alarm should have been raised when the patient showed 100% EWL or muscle mass was more than 20% of weight loss in the follow-up. The patient should be admitted, nutritional parameters assessed and replacement to be instituted immediately. The

Fig. 6.8 Cachexia in a malnourished post-bariatric patient

patient may require hydration, electrolyte correction, blood transfusion, enteral and parenteral nutritional supplementation and multivitamin infusion. This should be monitored till the patient shows signs of recovery. A bariatric surgeon should be consulted for considering a reversal of the procedure and restoration of normal gastrointestinal anatomy.

The patient was actively treated with nutritional support. He developed acute respiratory distress, neurological symptoms and cardiac arrhythmia at the end of the second week. What may be the cause of the condition?

Answer

This may be a case of Refeeding syndrome. This happens if the calorie replacement is too rapid in a malnourished patient. In order to create ATP, certain minerals like potassium, phosphate and magnesium can decrease substantially in the serum leading to cardiorespiratory and neurological symptoms.

The treatment is to increase the caloric replacement slowly with the monitoring and correction of these electrolytes.

Case 4

A 32-year-old vegetarian, lady with BMI 42 Kg/m^2 and infertility underwent a Roux en Y Gastric Bypass. She became pregnant a year later against medical advice. She was not compliant with nutritional supplementation.

Fig. 6.9 Phrynoderma

Three months after childbirth, she presented with weakness. On examination, she had this skin lesion (Fig. 6.9). What is this?

Answer

This is phrynoderma, a hyperkeratotic papular skin lesion usually observed in the extensor aspect of limbs, shoulders and buttocks. It represents severe malnutrition with a strong association with deficiencies of vitamins E, B, A and essential fatty acids. These patients need aggressive nutritional supplementation.

References

1. Lammers WJ, van Tilburg AJ, Apers JA, Wiebolt J. Liver failure caused by prolonged state of malnutrition following bariatric surgery. World J Hepatol. 2018;10(3):396–9.
2. Goodman JC. Neurological complications of bariatric surgery. Curr Neurol Neurosci Rep. 2015;15(12):79.
3. Aills L, Blankenship J, Buffington C, Furtado M, Parrott J. ASMBS Allied Health Nutritional Guidelines for the surgical weight loss patient. Surg Obes Relat Dis. 2008;4(5 Suppl):S73–108.
4. King WC, et al. Alcohol and other substance use after bariatric surgery: prospective evidence from a U.S. multicenter cohort study. Surg Obes Relat Dis. 2017;13(8):1392–402.
5. Müller A, Hase C, Pommnitz M, de Zwaan M. Depression and suicide after bariatric surgery. Curr Psychiatry Rep. 2019;21(9). Current Medicine Group LLC 1.
6. Thivel D, Brakonieki K, Duche P, Béatrice M, Yves B, Laferrère B. Surgical weight loss: impact on energy expenditure. Obes Surg. 2013;23(2):255–66.
7. Gu L, et al. Relationship between bariatric surgery and gastroesophageal reflux disease: a systematic review and meta-analysis. Obes Surg. 2019;29:4105–13.
8. Ablett AD, Boyle BR, Avenell A. Fractures in adults after weight loss from bariatric surgery and weight management programs for obesity: systematic review and meta-analysis. Obes Surg. 2019;29(4):1327–42.
9. Billakanty SR, et al. New-onset orthostatic intolerance following bariatric surgery. Pacing Clin Electrophysiol. 2008;31(7):884–8.
10. Voican CS, et al. Predictive score of sarcopenia occurrence one year after bariatric surgery in severely obese patients. PLoS One. 2018;13(5).
11. Cardeal MA, Faria SL, Faria OP, Facundes M, Ito MK. Diet-induced thermogenesis in postoperative Roux-en-Y gastric bypass patients with weight regain. Surg Obes Relat Dis. 2016;12(5):1098–107.
12. Sherf Dagan S, Tovim TB, Keidar A, Raziel A, Shibolet O, Zelber-Sagi S. Inadequate protein intake after laparoscopic sleeve gastrectomy surgery is associated with a greater fat free mass loss. Surg Obes Relat Dis. 2017;13(1):101–9.
13. Zouridaki E, Papafragkaki D-K, Papafragkakis H, Aroni K, Stavropoulos P. Dermatological complications after bariatric surgery: report of two cases and review of the literature. Dermatology. 2014;228(1):5–9.
14. Jensen P, Skov L. Psoriasis and obesity. Dermatology. 2017;232(6):633–9.
15. Romero-Talamás H, Aminian A, Corcelles R, Fernandez AP, Schauer PR, Brethauer S. Psoriasis improvement after bariatric surgery. Surg Obes Relat Dis. 2014;10(6):1155–9.
16. Ruiz-Tovar J, et al. Hair loss in females after sleeve gastrectomy: predictive value of serum zinc and iron levels. Am Surg. 2014;80(5):466–71.
17. Soleymani T, Lo Sicco K, Shapiro J. The infatuation with biotin supplementation: is there truth behind its rising popularity? A comparative analysis of clinical efficacy versus social popularity. J Drugs Dermatol. 2017;16(5):496–500.