
UNIT 1 PRINCIPLES OF GERIATRIC SURGERY

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1.0 OBJECTIVES

After reading this unit, you should be able to:

- perform a pre-operative assessment of elderly;
- e suggest prophylactic measures before surgery:
- provide better preoperative care, for better operative and post-operative results; and
- e advice post-operative care to avoid post-operative complications.

1.1 INTRODUCTION

In the previous blocks, you have learnt about the medical problems and their management in elderly. However, being a geriatric physician, you may at times come across surgical cases also. In such situations, you may be required to guide these patients so that they are medically better prepared for surgery and have fewer post-operative complications. Other collateral problems like diabetes, hypertension, ischemic heart disease would influence the indications for surgery. You as the clinician should look into problems which could be asymptomatic in addition to the patients complaints.

1.2 COMMON SURGICAL PROBLEMS

Problems arising from the natural aging process and cancers constitute the major causes of surgeries in the elderly. Let us discuss common surgical problems system by system:

Gastrointestinal System

Biliary tract diseases increase with age. The complications of biliary stones such as acute cholecystitis and acute pancreatitis also increase with age. The stones are mainly composed of cholesterol in the elderly. The pain is less specific in nature and character resulting in vague abdominal complaints.

Pancreatitis is also seen in the elderly. But the complications are severe and life threatening. Older patients are more likely to suffer from systemic complications like multi-organ failure and respiratory failure. Pancreatic cancer is largely a disease of the elderly.

Gastro-oesophageal reflux disease and oesophagitis incidence increase with age. Surgical help is given to patients with complications like stricture, aspiration etc. Oesophageal cancer is almost a disease of the elderly occurring mainly in the sixth to eighth decades of life. Duodenal ulcer disease presents with one of its complications, namely, perforation or haemorrhage. The mortality rate is quite high. Gastric ulcer disease is primarily in the elderly, majority caused by NSAIDs and H. Pylori. Appendicitis, though a disease of the young, can occur in the elderly with diagnosis in the late stages after complications arise. Diverticulitis is common in the aged of the western societies. Colorectal cancer should be considered in any elderly with altered bowel function. Lower G-I bleed is one of the commonest surgical emergencies in the aged. Hernias are also seen very frequently in the aged, with increased mortality and morbidity.

Vascular Surgery

In recent years, developments in vascular surgery have proved beneficial for the elderly in that carotid endarterectomy prevents recurrent stroke, aortic aneurysm can be repaired and lower extremity atherosclerotic occlusive disease can be treated with bypass surgeries. The number of coronary artery bypass procedures done in the elderly have increased. Non-operative revascularisation using PTCA technique is useful in patients in the seventh decade with single or double vessel disease.

As far as neurosurgery is concerned, the main procedures done in the elderly are evacuation of sub-dural haematoma and shunt procedures for hydrocephalus.

Transplant surgeries, orthopaedic joint replacement procedures and conservative surgeries for malignancies in the elderly like tumour debulking, colostomies and tumour bypasses are done frequently in the aged. There is no need to stress the vital role of surgery in restoring vision in the elderly, lost due to various causes like cataract, retinal diseases etc.

1.3 TYPES OF SURGERY

Surgery could be either elective or emergency. In many situations, decision making is easier for emergency rather than elective surgery. This is mainly due to the unfounded prejudice against the elderly. Taking proper care and assessment as discussed below will definitely reduce both the morbidity and mortality of surgery in the elderly, though the aged generally have a worse outcome after surgery than younger patients.

Improvements in surgical and anaesthesia techniques have made it possible to perform surgeries through keyhole incisions and are named as minimal access surgeries or laproscopic surgeries. These are found to be very useful in the elderly as compared to earlier techniques.

Laproscopic surgeries are associated with less post-operative pain, less atelectasis, less post-operative ileus, fewer wound complications, and a quicker return to normal activities. But the artificial pneumoperitoneum created by these surgeries can adversely affect cardio-vascular haemodynamics and hence those with severe cardiac-pulmonary compromise require careful monitoring.

1.4 INDICATIONS FOR SURGERY

While considering the need for surgery in an elderly individual, age alone should not be a negative indicator. Studies have shown that when operated for a morbid disease, age alone has little influence on prognosis.

When contemplating surgery in older patients, it is more appropriate to consider more concrete factors including the clarity of the surgical indication including the likelihood of progression of disease, the practical limitations imposed on the patient by the disease process, the degree of expected improvement after the procedure, the actual risk of post-operative mortality or morbidity as determined by the nature of the procedure and the presence of comorbid conditions and finally the quality of life that can be expected with or without surgery. For example in inguinal hernia, a truss can be used, though this avoids surgery in the short term, it can lead to long term increased morbidity and mortality.

State True (T) or False (F):

- a) Gastro-intestinal emergencies in the elderly are easily diagnosable. (T/F)
 b) Minimum access surgeries are useful in cholecystectomy and hernia. (T/F)

1.5 PRE-OPERATIVE ASSESSMENT

Pre-operative assessment deals with anticipating problems and planning the ways to deal with it pre-operatively. This will naturally lead to a better operative and post-operative course for the patient. The doctor should always keep in mind the possibility of multiple diseases in the patient though he has problems with only one system. This is very important because anaesthesia depends on the well being of the lung, liver, heart and kidney, though the surgery involves only one specific area. Pre-operative assessment includes assessment of the general health status including mental health, cardiovascular, pulmonary, metabolic and last but not the least the nutritional status of the individual. Physical examination should be combined with laboratory tests.

1.5.1 General Health Status

In the general examination, look for anaemia, jaundice, oedema, clubbing, examine the skin, see cognitive status, test vision and hearing.

Each test has its importance, Anaemia can predispose to post-operative hypoxia and wound infection and increase the risk of post-operative delirium. Jaundice indicates impaired liver function and careful usage of anaesthetic agents. Skin examination can give an idea about the patient's hydration status, endocrine status (e.g. myxoedema), and impending skin breakdown which can lead to post-operative bed sores. Pedal oedema indicates cardiac failure, liver disease, malnutrition or decompensated lung disease. In elderly patients in whom general anaesthesia is planned importance should be given to the presence or absence of cervical spondylosis, as inadvertent manipulation can lead to neurological complications. Similarly gait examination helps to identify many neurological disorders.

This examination also gives an idea about the authenticity of doing surgery in a patient. For example in those with severe cognitive impairment, non-surgical palliative procedures are preferred.

1.5.2 Respiratory Problems

Normal age related changes in the respiratory apparatus and respiratory centre leave the elderly vulnerable to several pre-operative and post-operative complications. These cause 15% to 30% of deaths in elderly surgical patients. Respiratory system diseases like chronic obstructive airway disease, bronchial asthma, volume loss of pulmonary tissue due to post infectious diseases also contribute to the problem. Hence our examination should focus on assessing the lung capacity and ways of improving it. The nature of surgery also matters—emergency surgery and incisions near the diaphragm increase the risk of post-operative complications.

Assessment starts with detailed clinical examination of the respiratory system. Other tests include chest x-ray, bedside spirometry to measure peak expiratory flow rate, detailed pulmonary function tests and arterial blood gas analysis. These tests will give an idea about lung volumes and the capacity to oxygenate.

1.5.3 Cardiac Problems

Cardiac complications are one of the major risks to elderly undergoing surgery. Nearly half the deaths post-operative are due to cardiac causes.

Surgery and anaesthesia cause enormous stress on the heart — cardiac output is increased, thereby increasing myocardial workload with increased myocardial stress. The association between increasing age and post-operative myocardial infarction is likely to be due in part to a secondary association between age and pre-operative ischemic heart disease. The other cardiac risk factors are myocardial infarction within 6 months, active heart failure, smoking,

diabetes, hypertension, arrhythmias, peripheral vascular disease, valvular heart disease and prior cardiac surgery.

Assessment involves a detailed clinical examination including history relevant to the risk factors mentioned above. Electrocardiogram and other tests are done when the given patient is suspected to be a high risk case. To determine which patient is a high risk case and need to undergo further tests, to assess ventricular and other cardiac functions, there is a scoring system devised by Goldman and modified by Detsky. This scoring system is beyond the scope of this programme.

Some of the high risk patients who undergo intensive tests may even need corrective care procedures before undergoing the surgery intended. Paradoxically, the patients undergoing cardiac surgery are less of a problem and older patients should not be deprived of those surgeries like coronary artery bypass grafting, aortic valve replacement, etc.

1.5.4 Fluid and Electrolyte Balance

The definitions of water depletion, dehydration, salt depletion are not possible in the elderly as symptoms are different in them. The increased prevalence of pre-existing renal disease and homeostatic impairment in the cardiovascular and renal system, the formation of guidelines for diagnosis and treatment are different in older patients.

For example, postural hypotension and lax skin tone may be present in patients without salt and water depletion and compensatory tachycardia may not develop in dehydrated patients. So it is important to look upon the clinical situation rather than the clinical signs alone.

Similarly, the type of fluid loss— whether water depletion alone or water and salt depletion is also important. Because predominant water depletion, e.g., hyperosmolar nonketotic diabetic coma, affects intracellular compartment, whereas water and salt depletion affects extracellular i.e. vascular compartment. Pure water loss tends to cause hypernatremia and reflects as irritability, confusion and drowsiness, and water and salt depletion cause hyponatremia and may present as circulatory collapse. It should be remembered that hyponatremia can occur in variety of conditions including congestive cardiac failure where there is actually water excess and dilution hyponatremia. Clinical signs like thirst, concentrated urine will not develop in older patients. You have already learnt about this in details in Unit I. Block 1 of Course I.

In elderly, body weight is a reliable indicator. Loss of more than 2 kgs is significant against loss of 4 kgs, 6-8 kgs and 10 kgs in mild, moderate and severe dehydration respectively for young patients. Rapid replacement of fluids is also hazardous in the elderly. Only half of the calculated depletion is to be given on the first day, the remainder over the next one or two days.

1.5.5 Nutrition

As in the case of fluid balance, assessment of nutrition is done using the usual scales such as height, weight, body mass index, triceps skinfold thickness, mid arm circumference etc. are not so reliable in the elderly. The following are the basic concepts as adapted by Hill and Windsor:

- Recent weight loss (in the last six months) is more important than earlier weight loss.
- Evidence of malnutrition together with significant impairment of function is more important than undernutrition alone.
- Impairment of function is recorded if two or more of the following have coincided with the period of weight loss:
 - Reduction in activity level
 - Reduction in skeletal muscle function (such as hand grip strength)
 - Respiratory impairment (respiratory effort, coughing and dyspnoea)
 - Impaired wound healing
 - Serum albumin less than 3.2 gm / litre
 - Altered mood, alertness, ability to concentrate, irritability

Those patients who have lost more than 10% of their body weight with impairment of function are at increased risk of developing post-operative pneumonia, septic complications and other problems with increased hospital stay.

- 1) An elderly patient is posted for prostate surgery under general anaesthesia. Which of the following are necessary?
- ECG
 - Serum electrolytes
 - Serum proteins
 - Spirometry
 - All of the above
- 2) Body weight is helpful in assessing nutritional status in the elderly. (T/F)

1.6 LABORATORY ASSESSMENT

Pre-operative lab assessment serves as a **baseline** test; it also helps to find out hidden infection, organ failure and silent disease.

Haematological tests include **complete haemogram** and coagulation profile. Biochemical tests including electrolytes, blood glucose, urea nitrogen, serum **creatinine** and serum albumin should be done routinely as each has its specific value.

An electro-cardiogram is a must in all geriatric patients. A chest x-ray is also done routinely as it not only picks up disease but also serves as a baseline to compare with post-operative x-ray.

As discussed previously, further tests for cardiac and respiratory function are warranted in the appropriate circumstances. Abdominal ultrasound is useful in detecting prostate size, assessing the liver and the uterus.

1.7 PROPHYLACTIC MEASURES

The prophylactic measures depend on the results of the clinical examination and the lab results and the nature of surgery — whether major or minor.

General Measures

If the patient is **malnourished**, the nutrition should be taken care of, oral replacement is always better than intravenous replacement. The skin should be inspected for any sign of pressure sores in bedridden patients and if present, treated adequately. Anaemia should be corrected and blood reserved if needed. Smoking is to be stopped at least two months before surgery. Obese patients are encouraged to lose weight.

Specific Measures

In patients with known lung disease, drug therapy with **bronchodilators**, antibiotics and steroids if necessary is started. Pre-operative and post-operative respiratory physiotherapy techniques should be taught to patients. During anaesthesia, use of **warm humidified gas** is preferred to avoid high oxygen concentration. Periodic lung expansion is done to prevent lung collapse.

Elderly patients are at high risk of developing deep vein thrombosis. **Increasing age**, cardiac failure, myocardial infarction, cancer, **stroke** and obesity are some of the risk. So to prevent post-operative deep vein thrombosis, heparin is started **2 hours** before surgery and given every 8 to 12 after surgery. Warfarin can also be used, beginning 1 to 2 days before surgery and continuing until the patient is able to walk. Low molecular weight heparin is preferable.

Non-pharmacological techniques of preventing DVT include properly fitted, graduated elastic compression stockings and pneumatic **compression** stockings. Their use should be started before surgery and continued for at least **three** days post-operative or till the patient becomes mobile.

1.8 POST-OPERATIVE CARE

Pre-operative assessment should be directed also to predict post-operative problems and the ways to tackle them. Studies have shown that post-operative complications directly

contributable to anaesthesia have no correlation to age whereas cardio-pulmonary complications occurring post-operatively increase with age. Other important aspects of post-operative care are adequate pain relief, prevention and management of post-operative delirium, prevention of deep vein thrombosis and decubitus ulcer, management of urinary problems and constipation. Let us learn about some of the post-operative problems and ways to manage them.

1.8.1 Post-operative Complications

Post-operative hypoxia is the recurring periods of hypoxia with oxygen tension going below 60% on the 2, 3, 4 post-operative days while maintaining normal oxygen concentration on the first post-operative day.

The stress of surgery and opiate usage are the causative factors. This condition can be identified by monitoring oxygen concentrations on the first five days after surgery using pulse oxymeters.

The other main pulmonary complication is atelectasis (lung collapse). If untreated this can lead to pneumonia. Increasing age, incision near the diaphragm, obesity, prolonged bed rest and too much post-operative sedation are the main causes.

The above mentioned post-operative hypoxia can cause repeated episodes of subclinical myocardial ischemia. In elderly patients and those with other cardiac risk factors, myocardial infarction can occur. This is difficult to diagnose as symptoms can be masked by post-operative analgesia and anaesthesia and cardiac enzyme rise can be a result of surgical trauma.

Delirium is one of the common complications in post-operative patients. Occurrence is associated with prolonged hospital stay, long term care after discharge, decreased ability to walk, falls, high incidence of post-operative complications and death. To reduce the risk of post-operative hypoxemia, prophylactic O₂ via nasal cannula for 3 days and 5 nights to be given.

Post-operative myocardial infarction has higher mortality rate to as much as 50%. Troponin-T enzyme rise is used rather than the routine enzymes to diagnose myocardial infarction.

Post-operative pain management depends on the severity of pain. For severe pain, epidermal anaesthesia and narcotics can be given. For less severe pain, NSAIDs and paracetamol can be given.

Regarding post-operative delirium, the best approach is to prevent it. In a person with sensory deprivation, patient should be oriented by verbal and visual and their glasses and hearing aids should be replaced as early as possible after surgery. Medications to be kept to a minimum and side effects should be monitored. Once delirium has set in, the investigation should be done promptly to find out the cause and should be corrected. For violent and agitated patients, haloperidol at the lowest effective dose is useful. Benzodiazepenes and chlormethiazole are useful in alcohol withdrawal states.

Urinary incontinence and or retention also can develop. These will lead to further complications like decubitus ulcer, infection etc. Urinary incontinence can be of any of the four types viz., stress, urge, overflow and functional. Main precipitating factors are delirium, infection, atrophy of genitals, diseases causing polyuria, pharmacological agents, environmental causes, restricted mobility. Previously asymptomatic prostate disease can be manifested as urinary retention.

1.8.2 Management of Post-operative Complications

As we have already learnt cardiopulmonary causes are the leading cause of post-operative mortality, we should ensure that they are well taken care of. The high risk cases with pulmonary disease should be monitored with pulse oximeters. Inspiration physiotherapy is continued for 3 to 5 days. Continuous positive air way pressure administered by mask may be needed. Adequate analgesia early removal of nasogastric tubes, and early mobilization is beneficial to the patient.

Intraoperative catheterisation used for 24 hrs after orthopaedic surgery decreases the incidence of post-operative retention. The catheter should be removed at once without clamping.

Early mobilization of patients prevents many complications like DVT, pneumonia, constipation etc.

Post-operative wound sepsis is a common cause of post-operative morbidity. More serious sepsis such as intra abdominal sepsis or widespread septicaemia with multi organ failure remains a major cause of post-operative mortality at all ages, particularly the elderly. It can be prevented by giving a single dose antibiotic given before one-half hour before surgery.

The choice of antibiotic depends on the sensitivity pattern. Early identification of sepsis and treatment with full antibiotic course is essential.

Check Your Progress 3

- 1) Age alone is a risk factor for increased post-operative morbidity. (T/F)
- 2) Which one of the below is not a post-operative complication after abdominal surgery?
 - a) pain
 - b) pulmonary atelectasis
 - c) meningitis
 - d) urinary incontinence

1.9 LET US SUM UP

Many surgically treatable conditions become common in elderly. To reduce morbidity and mortality, both elective and emergency surgeries are done in elderly. The presentation of diseases is bizarre and greater degree of suspicion is needed to diagnose. Pre-operative clinical and laboratory assessment is done to unfold any co-morbid conditions also. Necessary pre-operative prophylaxis prevents post-operative complications.

1.10 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- a) F
- b) T

Check Your Progress 2

- 1) a, b, c
- 2) T

Check Your Progress 3

- 1) T
- 2) c

1.11 FURTHER READINGS

Evans, J. Grimley, T. Franklin Williams, *Oxford Text Book of Geriatric Medicine*, Oxford University Press, Oxford, 1992.

I-lazzard, William, *et al.*, *Principles of Geriatric Medicine and Gerontology*, Fourth edition, New York, 1999.