Geriatric anesthesia

The geriatric population (The elderly) experiences significant alterations of many organ systems as a result of the ***aging process***. They also have several ***co-morbidities*** including hypertension, cardiac disease, diabetes, cerebrovascular disease, and renal dysfunction. Geriatric patients are considered vulnerable and especially sensitive to the stress of trauma, surgery, and anesthesia.

GERIATRIC ANESTHESIA STRATEGIES

A. Preoperative Evaluation

Tests should be directed toward the type of surgery, known co-existing disease, and history and physical examination findings. Electrocardiogram (ECG), hematocrit (Hct), and hemoglobin (Hgb) are often the most useful tests.

1. Cardiac

Major indicators of cardiovascular risk are unstable coronary syndrome, decompensated heart failure, significant or unstable dysrhythmias, and severe or critical valvular disease, especially aortic stenosis. Cardiac testing should be reserved for patients undergoing intermediate- or high-risk surgery.

2. Pulmonary

Referral to a pulmonologist may be indicated if the patient has signs and symptoms of undiagnosed or decompensated lung dysfunction. Risk factors for postoperative pneumonia include the inability to carry out the activities of daily living, weight loss of 10% or more in the previous 6 months, history of stroke, long-term steroid use, smoking, and underlying lung disease.

3. Renal

It is wise to obtain serum electrolyte levels and creatinine concentration before procedures that carry a significant risk of renal failure (e.g., cardiopulmonary bypass, aortic aneurysm resection, or surgeries in which large fluid shifts or significant blood loss are anticipated).

4. Hepatic

Baseline liver function tests may be reasonable before surgeries that involve significant liver manipulation.

5. Diabetes Mellitus

Poor glucose control (blood sugar higher than 200 mg/dL) is associated with **a risk** of aspiration, poor wound healing, infection, cardiac and cerebral events, and autonomic dysfunction. Whenever possible, control of serum glucose to levels of 120 to 180 mg/dL is desirable before surgery.

6. Malnutrition

Serum albumin below 3 g/dL with hypocholesterolemia and low body mass index is indicative of malnutrition.

B. Pharmacokinetics and Pharmacodynamics

There is no evidence that any specific inhaled or injected anesthetic agent is preferable in elderly patients. Changes in body composition can affect the distribution, metabolism, and clearance of drugs.

1. Total Body Water:

Total body water is decreased, leading to a higher plasma concentration of hydrophilic drugs for a given dose.

2. Adipose to Lean Muscle Ratio:

The ratio is increased, and the volume of distribution of lipophilic drugs is greater, facilitating the accumulation of drugs and prolongation of effects. This is even more pronounced in the face of impaired hepatic or renal function.

3. Circulation Levels of Drug-Binding Proteins:

Levels decrease, leading to increased free drug and drug effects.

4. Decreased Cardiac Output.

This may prolong circulation time and may result in more rapid uptake of volatile agents.

5. Muscle Relaxant Effects

Decreased muscle blood flow delays the onset of action. Reduced clearance by the liver and kidneys may prolong the action of some relaxants.

6. Multiple Drug Prescriptions

Commonly, elderly patients are taking multiple medications, which may lead to undesirable drug effects or drug interactions.

7. Minimum Alveolar Concentration (MAC) of Volatile Agents

MAC decreases with age, about 4% per decade after 40 years of age.

C. Anesthetic Plan: *Anesthetic management for elderly*

Patients require consideration of many details:

1. Anesthetic Technique

Retrospective and prospective studies have failed to show the benefit of regional versus general anesthesia. The technique should be based on patient choice, the anesthesiologist's experience with the technique, the American Society of Anesthesiologists (ASA) status of the patient, and the planned operation.

2. Monitoring

Monitoring should be based on potential risks and benefits, the potential for large blood loss or fluid shifts, the ASA status and comorbidities, and the planned surgery.

3. Optimal Analgesia

Treatment of analgesia may be challenging due to pharmacokinetic and pharmacodynamics changes and the side effects of analgesic drugs.

➢Dementia, delirium, and problems with hearing and vision can complicate pain assessment. The physiologic consequence of inadequate analgesia (tachycardia, hypertension, agitation) may be poorly tolerated.

❖Postoperative Delirium

Delirium is defined as an acute alteration in cognitive function that progresses over a brief period lasting for a few days to a few weeks.

Risk Factors

1. Advanced age (>70)
2. Underlying dementia.
3. Various comorbidities
4. Drugs (narcotics and benzodiazepines).
5. Alcohol abuse.
6. Previous episodes of delirium.
7. Visual impairment.
8. Certain types of injuries (e.g., hip fractures).
9. Elevated blood urea nitrogen (BUN).

Treatment

Treating underlying disorders, 0.25 to 2 mg of oral haloperidol for acute control of delirium is the preferred treatment, but diazepam, droperidol, and chlorpromazine are also often used with good results.

Selects the best single choice

1- All the following are decreased in elderly except one
a) Cardiac output.
b) Total body water.
c) Circulation level of drugs binding proteins.
d) Adipose to lean muscle ratio.
e) Muscle blood flow.
2- The physiologic consequence of inadequate analgesia in elderly is
a) Hypotension.
b) Tachycardia.
c) Sedation.
d) Fever.
e) Bradycardia
3- Risk factors for postoperative pneumonia in elderly include (all true except one)
a) history of stroke.
b) Smoking.
c) underlying lung disease.
d) short-term steroid use
e) inability to carry out the activities of daily living
4- anesthetic plan for elderly patient (all true except one)
a) anesthetic technique is based on patient choice and anesthesiologist experiencing
b) analgesia may be challenging due to pharmacokinetic and pharmacodynamics changes.
c) MAC for inhalational agents is increases with age, about 4% per decade after 40 years of age.
d) Risk of post operative delirium.
e) prolong the action of some relaxants.
5- All the following are risk factors for delirium postoperatively in elderly except one
a) Visual impairment.
b) Underlying dementia,
c) Alcohol
d) Rib fracture.
e) Advance age.