Oral and maxillofacial surgeons:
The experts in face, mouth and jaw surgery®

Patient Selection Issues for Outpatient Anesthesia: The Geriatric Patient

Wednesday, January 11, 2017

6:00 pm EDT • 5:00 pm CDT • 4:00 pm MDT • 3:00 pm PDT

Stuart E. Lieblich, DMD

Private Practice, Avon, CT

Brought to you by:
American Association of Oral and Maxillofacial Surgeons
9700 W. Bryn Maw Ave., Rosemont, IL 60018
Phone: 800-822-6637 • Fax: 847-678-6286 • www.AAOMS.org • conteducate@aaoms.org

Continuing Education Provider Approval

The American Association of Oral and Maxillofacial Surgeons is an ADA CERP Recognized Provider.

ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

The American Association of Oral and Maxillofacial Surgeons designates this activity for 1 continuing education credit.
AGD - Accepted Program Provider
FAGD/MAGD Credit
5/1/14 – 6/30/18
Provider ID# 214680

The American Association of Oral and Maxillofacial Surgeons (AAOMS) is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The American Association of Oral and Maxillofacial Surgeons designates this live activity for a maximum of 1 *AMA PRA Category 1 Credit*(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

2017 Patient Selection Issues for Outpatient Anesthesia: The Geriatric Patient
Faculty and Planner Disclosure

The American Association of Oral and Maxillofacial Surgeons (AAOMS) is accredited as a provider of continuing medical education by the Accreditation Council for Continuing Medical Education (ACCME) and is recognized as a provider of continuing dental education by the American Dental Association Continuing Education Recognition Program (ADA CERP). The AAOMS adheres to the ACCME accrediation requirements, including the Accrediation Critiera, the ACCME Standards for Commercial Support and the ACCME policies, and the AAOMS adheres to the ADA CERP Standards and Procedures in its development and delivery of continuing medical and continuing dental education activities.

It is the policy of the AAOMS to ensure balance, independence, objectivity and scientific rigor in scientific/educational activities. All faculty and others who participate in the planning and execution of an AAOMS activity are required to disclose relevant financial relationships with commercial interests. A commercial interest refers to any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients. The principal intent of requiring disclosure information is not to prevent faculty with relevant financial relationships from the planning or delivery of content, but rather to ensure that AAOMS CDE/CME activities promote quality and safety, are effective in improving practice, are based on valid content, and are independent of control from commercial interests and free of commercial bias. Disclosure is required so that course directors may reasonably decide whether to make adjustments in the activity and its faculty, and so that participants in the activity may formulate their own judgments regarding commercial bias in the presentation in light of full disclosure of related information.

All faculty and others who participate in the planning and execution of an AAOMS educational activity have been informed of the AAOMS Policy on Disclosure of Relevant Conflicts of Interest. Faculty who have disclosed industry relationships have been counseled, in writing, of the necessity to deliver their presentations in a manner free of commercial bias. Written notification is made, in accordance with AAOMS Policy, to resolve and relevant conflicts of interest.

The following faculty have reported the following industry relationship disclosures:

Lieblich, Stuart, DMD
Pierrel Pharma: Speakers' Bureau; Pacira Pharma: Consultant

Planning Committee Disclosures

In accordance with ACCME guidelines, the following disclosures are provided for members of the AAOMS Board of Trustees, AAOMS educational planning committees and AAOMS staff. Members of the groups identified below have participated in the planning, development and implementation of this educational activity.

Board of Trustees

The following members of the AAOMS Board of Trustees have reported that they have no industry relationships to disclose:

Clark, Robert S., DMD
DiFabio, Vincent E., DDS, MS
Fain, Douglas W., DDS, MD
Ferguson, Brett L., DDS
Indresano, A. Thomas, DMD
Johnson, J. David, Jr., DMD
Lambert, Paul M., DDS
Nannini, Victor, L., DDS
Nelson, Steven R., DDS, MS
Nelson, William J., DDS
Rafetto, Louis K., DMD
Tiner, B.D., DDS, MD

Committee on Continuing Education and Professional Development (CCEPD)

The following members of the CCEPD have reported the following industry relationship disclosures:

Kademani, Deepak, DMD, MD
Zimmer Biomet: Consultant; Vista Dental: Research Grant; Elsevier: Royalties

Miloro, Michael, DMD, MD
Axogen, Inc.: Consultant

The following members of the CCEPD have reported that they have no industry relationships to disclose:

Busino, Lawrence, DDS
Grogan, David M., DDS, MSD
Hudson, John-Wallace, DDS
Meara, Daniel, MS, MD, DMD
Park, Chan, DDS, MD
Sabino, MaryAnn C., DDS, PhD
Schreiber, Andrea, DMD
Shafer, David, DMD
Shah, Gaurav, DMD
Steinberg, Mark J., DDS, MD
Waite, Peter D., DDS, MD

AAOMS Staff

The following members of AAOMS Staff have reported that they have no industry relationships to disclose:

Adams, Mark, JD
Armour, Yolanda
Bonfield, Heidi
Choyke, Barbara S., CAE
Farrell, Scott C.
Hayson, Beth
Jones, Samantha E.
Kremer, Jolene
Lee, Caroline P.
Murray, Shannon
O'Brien, Kelly
Peterson, Shannon
Schnitzer, Mary
Serpico, Patricia
Teplitz, Janice K.
Wittich, Karin K.

All reported relevant conflicts of interest have been resolved by the Committee on Continuing Education and Professional Development and other planning committees as of 12/6/2016.

Geriatric Patients Evaluation/Selection

Stuart Lieblich, D.M.D.
Clinical Professor, University of Connecticut
Private Practice, Avon Oral and Maxillofacial Surgery, Avon CT
StuL@Comcast.net

Aging

General decline in all organ function
Co-morbid diseases
Multiple drug use

Assessment of the Geriatric Patient

Age
- Chronologic
- Physiologic
  - Increasing frailty
  - Decreased resilience
    - Ability to tolerate decr O2; BP changes, HR changes
  - Decreased reserve
    - Ability to respond/compensate for above changes

Pre-Anesthetic Assessment

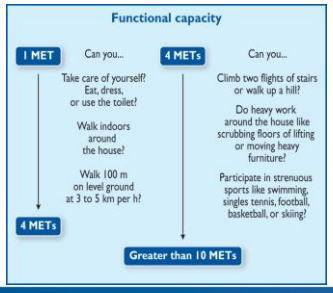
- Blood pressure
- Pulse
  - Rate
  - Rhythm
- Observe respiratory rate

Initial Anesthesia Assessment: Who do I consider a candidate?

- Vital signs
- Medical history
  - Co-morbid diseases?
  - How have you been feeling lately?
  - How many medications do they take (>5=danger zone)
- Can they go up a flight of steps? (METS >4)
- Can they take deep breath and hold it for 5-10 seconds?
- Can they extend head/open mouth wide

Assessment of reserve

METS



System Specific Geriatric Assessment

Cardiac Issues

Cardiac Issues of Aging

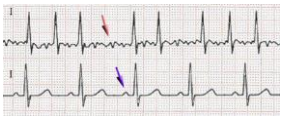
- Increased fibrosis, decreased elastin, decreased myocete #
  - Vascular stiffness, systolic HTN,
- Fibrotic infiltration of the conduction system
  - Leads to a-fib
- Diastolic dysfunction
  - LV cannot return to resting length
  - Time in diastole is shortened due to increased afterload
- Cannot tolerate:
  - Hypervolemia
  - Hypovolemia

Cardio/vascular issues

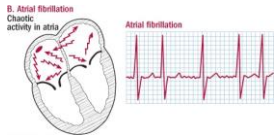
- at rest: Hypertension/bradycardia
- under anesth: Hypotension/labile blood pressure/labile heart rate
- Dysautonomia of aging
  - Sympathetic responses dominate
    - Loss of beta receptor activity
    - Lose exercise tolerance

What is Atrial Fibrillation?

Disorganized atrial rhythm
Irregular ventricular response
The most common arrhythmia in geriatric patients



Atrial Fibrillation



What causes A Fib?

Remodeling of the left atrium with fibrosis and muscular atrophy

Inflammatory model: pro-inflammatory mediators and cytokines cause breakdown of normal cardiac musculature.

Atrial Fibrillation

Paroxysmal
- Self terminating

Persistent
- Requires medical or electrical termination

Permanent
- Unsuccessful termination attempts

Drugs used for AF

Rhythm control

Rate control

Anti-embolic

Rhythm Control

Amiodarone

Verapamil

Sotalol

Rate Control

Permanent AF
- Beta blockers
- Calcium channel blockers
- Digoxin

May cause bradycardia
- If persistent then pacing indicated to continue the meds

Anticoagulation

Risk is similar in paroxysmal, persistent and permanent AF

Not related to duration of episodes and time in AF

Effective for primary and secondary CVA protection

- Reduction in stroke 60% vs. placebo

Who Gets Anticoagulated? Warfarin Use

ASA 325 once a day

- < 60 years no heart disease
- <60 years heart disease no other risk factors
- 60-75 years no other risk factors
- If warfarin recommended but contraindicated or refused

Warfarin to INR of 2

- > 75 years age, especially women

Warfarin to INR 2-3

- >60 with diabetes or heart disease +/- ASA
- HF with EF <35%, thyrotoxicosis or hypertension

Warfarin INR 2.5 -3.5

- Rheumatic heart disease
- Mitral stenosis
- Prosthetic valve
- Previous embolism; current atrial thrombus

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Periodontal disease is the issue

Safety of Dental Extractions
During Uninterrupted Single or
Dual Antiplatelet Treatment

The American Journal of Cardiology (www.ajconline.org)

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Risks of Extractions on Anti-platelet therapy

Study group: overall bleeding 1.8%

- ASA 100mg 1.1%
- Clopidogrel 3.1%
- Clopidogrel + ASA 4.2%

15 cases of post operative bleeding

- 12 simple extractions
- 11 with periodontal disease

Dental extraction without stopping single or dual antiplatelet therapy: results of a retrospective cohort study. IJOMS 45(10): 1293, 2016

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Best Ways to Assess Cardiac Reserve

METS

Blood pressure

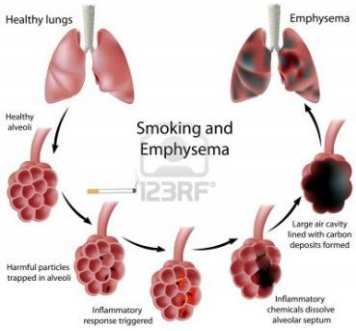
Stable rhythm

Cardiac/HTN medications <3

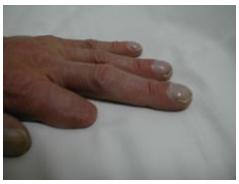
American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Pulmonary Issues

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™



Severe Respiratory Compromise



Clubbing
Nail bed cyanosis
Severe PVD

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Pulmonary Issues

- Stiff neck
- Fibrosis of lung alveoli
- Decreased ability to expand lungs
- Abdominal obesity compromising FRC
- Decreased sensitivity to acid base/CO2 changes
- Increased response to medications.

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Hepatic Issues

Hepatitis
Cirrohsis

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Hepatic Issues

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Signs of Hepatic Failure

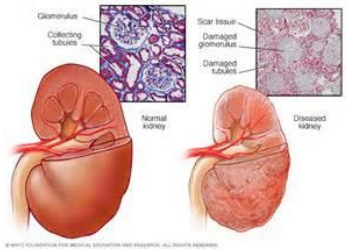
Fatigue
*Low platelets: petichiae
Nausea (one of first signs)
*Ascites or peripheral edema
Jaundice
*Bruising easily
Splenomegaly
Vague gastric pain
Diarrhea
Loss of appetite

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

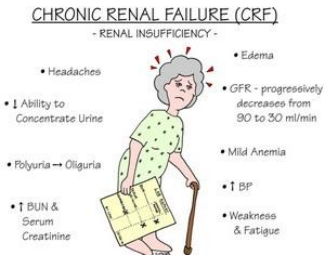
Hepatic Issues

- Decreased hepatocytes/activity
- Increased duration of drug
- Decreased albumin production

Renal Issues: natural aging process



Renal Disease in the Geriatric Patient

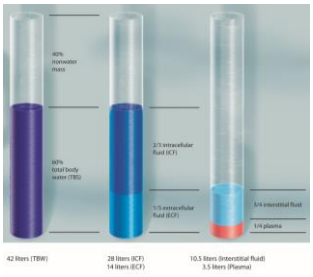


Renal Issues

- Decreased GFR
  - Decreases clearance of drugs
  - Potentially prolonged action
- Decreased TBW
  - Increases profundity of drug effects
  - Increased duration of action (decrease in Vd)

Fluid Management in the Geriatric Patient

Preop fasting = hypovolemia
8 hour fast= 800 mL deficit



Drug Effects

- Slower time of onset
- More profound effect
  - Lower net drug amounts
  - Less plasma proteins/TBW
- Longer times for recovery

Issues with Drug Effects and Elderly

- Pre-existing dementia
- Pre-existing Alzheimer's
- Post anesthetic delirium
- Post anesthetic cognitive dysfunction (POCD)

CNS issues and the Elderly

- Loss of synapses and brain mass
- Reduction in neurotransmitter activity
  - Dopamine: decline in cognitive and motor performance
  - Serotonin: decline in synaptic responses
  - Decreases cholinergic activity: vulnerable to anti-cholinergics
    - Atropine
    - Meperidine
    - Diphenhydramine
    - Benzodiazepines

Emergence Delirium

Affects 1.3% of all general anesthetics in the PACU

Range of responses

Can have delayed reaction

Emergence Delirium:

Riker Agitation Scale		
7	Dangerous agitation	Pulling at ET tube, cath, fighting, punching
6	Very agitated	Does not calm, biting ET tube, phys restraints
5	Agitated	Attempt to sit up, calms with requests
4	Calm and cooperative	
3	Sedated	Difficult to arouse
2	Very sedated	Arouses to phys stimulation
1	Unarouseable	Minimal response

Pathophysiology

Theories:

- Neurotransmitter decline during anesthesia, specifically acetylcholine
  - Elderly have pre-existing deficiency
  - More sensitive to anti-cholinergic drugs
  - Benzodiazepines have anti-cholinergic effects
- Increased serum cortisol during anesthesia/surgery
- Hypocapnia decreases cerebral blood flow
- Disturbance in sleep-wake cycle

Alzheimer's Disease Drugs

Cholinesterase inhibitors:

- Aricept (donepzil)
- Exelon (rivastigmine)
- Razadyne (galantamine)

Therefore use drugs that are not anticholinergic

Factors Associated with Post Anesthesia Delirium

Preoperative anxiety
Premedication with benzodiazepines
Longer surgical procedures
Use of inhalational agents vs. Propofol
Post operative pain
Reduced instance in patients with long term antidepressant use

Emergence Delirium

Central anticholinergic syndrome

- Delirium, agitation, dry mouth, tremors
- Primarily associated with atropine
- Scopolamine
- Anti-drugs
  - Antihistamines
  - Antidepressants
  - Antipsychotics
  - Antiparkinson

Central Anticholinergic Syndrome

Toxidrome

- "Crazy as a loon
- Red as a beet
- Hot as a hare
- Dry as a bone
- The bowel and bladder lose their tone
- The heart runs alone"

Treatment

Physostigmine

- Anticholinesterase inhibitor
- "Antilerium"
- May have recurrence of effect

Dissociative Coma

Continued stupor, unresponsiveness
Associated with ketamine
Benzodiazepines in the elderly

- 10-15% of cases
- Develop interval delirium: lucid interval with effect 1-3 days later
- Greater effect during darkness

Why are Elderly More Suseptible?

Decreased ability to clear drugs (age related decline of renal and hepatic function)
Often receiving multiple drugs

- Age >70 average rx # is 5.4

Central imbalance of neurotransmitters due to age related changes

- Increased sensitivity to drug effects

Drugs Associated with Cognitive Impairment

Benzodiazepines
Opiates
Tricycylic antidepressants
Anticonvulsants

Drug Selection with Elderly/Dementia

Drug to avoid	Alternative
Narcotic Analgesics ▪ Meperidine	Mild pain: NSAID Moderate/severe: ▪ Morphine ▪ Hydrocodone/oxycodone
Antiemetics ▪ Cyclizine ▪ Meclizine (Antivert) ▪ Promethazine (Phenegran) ▪ Trimethobenzamide (Tigan)	Ondansteron Dolasetron (Metoclopramide (Reglan) & Prochlorperazine (Compazine) have less AC effect)

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Disinhibition Reactions

Also associated with BNZ
Paradoxical response
- Acute anxiety
- Hyperactivity
- Hostility
- Rage

Cross response with other GABAa receptor agonists
- Alcohol

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

Who is at Risk?

Genetic factors
- Identical twins

Underlying personality disorder
- History of aggression
- Poor impulse control
- May have lower serotonin 5HT activity
  - BNZ further reduce 5HT neurotransmission

Very young/very old
High dose/high potency
Fluctuating doses

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

mangement

Patient safety
Staff safety
Reversal (Do not give more!)
- Flumazenil
- Physotigmine

Alternative agents
- Ketamine
- Narcotics

Patient education

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

POCD (decline/dysfunction) (no DSM-V code)

Undefined /vague / subtle / transient
- Syndrome…measured (testing needed) drop in cognitive performance (memory, attention) temporally associated with surgery
- "Failure of cognitive resilience"

Gradual onset, undetermined duration
Difficult to Dx, no Tx

American Association of Oral and Maxillofacial Surgeons
Oral and maxillofacial surgeons: The experts in face, mouth and jaw surgery™

POCD

Predictors

- Advanced age
- Low educational level
- Frailty, prior CVA
- Co-morbidity, polypharmacy (>5 drugs)

Provokers

- Depth / duration of anesthesia
- Inflammation?
- Smoking
- Drugs ? … Beers criteria
  - "association NOT causation"

POCD

CLINICAL INVESTIGATIONS

American Geriatrics Society 2015 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

By the American Geriatrics Society 2015 Beers Criteria Update Expert Panel

Recommend against short/intermediate BZ (triazolam, lorazepam)

But not against long acting: e.g. Diazepam (OK for "periprocedural sedation")

Midazolam not mentioned

POCD

Avoid / potentially inappropriate

- Non BZ BZ receptor agonists
  - Xaleplon, zolpidem
- BZ – but "midazolam" not on list
- Anti-cholinergics – 1st gen anti-histamines, atropine
- Meperidine, pentazocine

POCD: PIM

Table 7. Commonly Used Medications Used in the Perioperative Setting That May Induce Postoperative Delirium[40]

Drug class or drug	Examples
Drugs with anticholinergic properties	Tricyclic antidepressants: amitriptyline, doxepin, imipramine Antihistamines: cyproheptadine, diphenhydramine, hydroxyzine Antimuscarinics: oxybutynin, tolterodine Antispasmodics: hyoscyamine, scopolamine First-generation antipsychotics: chlorpromazine, thioridazine H_2-receptor antagonists: cimetidine, ranitidine Skeletal muscle relaxants: cyclobenzaprine, tizanidine Antiemetics: promethazine Olanzapine Paroxetine
Corticosteroids	Methylprednisolone Prednisone
Meperidine	Meperidine
Sedative hypnotics	Benzodiazepines: alprazolam, diazepam, lorazepam, midazolam Sedative-hypnotics: zolpidem, zaleplon
Polypharmacy	Starting ≥5 new medications increases risk of delirium.

PIM per AGS

Non benzodiazepine receptor agonists ("Z drugs") (zolpidem Ambien)*

Sliding scale insulin regimens

Proton pump inhibitors (Protonix) for > 8 weeks

Opioids in history of patients with falls

*Benzodiazepine-receptor agonists have adverse events similar to those of benzodiazepines in older adults (e.g., delirium, falls, fractures); increased emergency department visits and hospitalizations; motor vehicle crashes; minimal improvement in sleep latency and duration

Sliding scale insulin PIM per AGS Beers criteria

Higher risk of hypoglycemia without improvement in hyperglycemia management regardless of care setting;

refers to sole use of short- or rapid-acting insulins to manage or avoid hyperglycemia in absence of basal or long-acting insulin; does not apply to titration of basal insulin or use of additional short- or rapid acting insulin in conjunction with scheduled insulin (i.e., correction insulin)

NSAID's per AGS Beers Criteria

Increased risk of gastrointestinal bleeding or peptic ulcer disease in high-risk groups, including those aged >75 or taking oral or parenteral corticosteroids, anticoagulants, or antiplatelet agents;

use of proton-pump inhibitor or misoprostol reduces but does not eliminate risk. Upper gastrointestinal ulcers, gross bleeding, or perforation caused by NSAIDs occur in approximately 1% of patients treated for 3–6 months and in ~2–4% of patients treated for 1 year; these trends continue with longer duration of use

Indomethacin and Ketoralac per AGS

indomethacin has the most adverse effects.

Avoid use; Evidence level = Strong

Ketorolac, includes parenteral Increased risk of gastrointestinal bleeding,

peptic ulcer disease, and acute kidney injury in

older adults

ketamine

Possibly neuroprotective

- Ensure cerebral circulation
- Anti-inflammatory

Tx for depression ?

propofol

"milk of amnesia"

Rapid, clear-headed, euphoric recovery

Anti-emetic

CV – hypotension without tachycardia

- Careful with old, hypovolemia, ↓cardiac reserve

Resp – dose-dependent vent. depression

Intralipid Injection pain…

Contamination…ETDA, etc.

propofol

Dose – dependent upper airway collapse

- Should this be monitored ???

Rare, neuroexcitory reaction

- Tonic-clonic
- Dystonic

propofol

Patients with soy or egg allergy can receive propofol without any special precautions.

- In spite of product labelling

American Academy of Allergy, Asthma and Immunology, 2011

benzodiazepines

Anxiolysis, Sedation, Amnesia,, MR
- Activity:degree of receptor binding

No analgesia – need narcotic

Little CV/pulm effects
- Dose dependent !
- Synergy – all bets off

benzodiazepines

Paradoxical disinhibition

Diazepam
- Propylene glycol phlebitis
- Active metabolites = hangover

Midazolam
- CYP inhibitors may delay offset
- Active metabolite ?

benzodiazepines

Anxiolysis, Sedation, Amnesia,, MR
- Activity:degree of receptor binding

No analgesia – need narcotic

Little CV/pulm effects
- Dose dependent !
- Receptor dependent!
  - Unexpected apnea

Conclusions: Anesthetic Medications

***Table 13.2** Anesthetic modifications for the geriatric population.

REDUCE DOSAGES and administer slowely

↓ blood volume and ↓ muscle mass → ↑ initial drug concentration

↓ protein binding→ ↑ free drug available for effect

↓ muscle mass, ↑ fat → prolonged effect as drug is released from fat stores

*Schreiber A, Tan P: Anesthetic considerations for geriatric patients, in Rosen P, Hetzel S: Complications in Anesthesia, p 102.

INCREASE INTERVAL BETWEEN DOSES

Limit total doses

Consider changes in receptor sensitivity, pharmacokinetics and pharmacodynamics

↓ hepatic and renal function → ↓ability to metabolize and excrete drugs

PRUDENT AGENT SELECTION

Short half life

Minimal side effects

Few active metabolites

Thanks for your participation!

Please feel free to type in any questions