This topic is discussed under the following headings so as to deal with all aspects of Geropharmacology.

1. Changes in elderly
2. Drug behavior in elderly
3. Problem associated with use of drugs in the elderly
4. Appropriate prescribing in the elderly
5. Drug selection in the elderly

1. CHANGES IN ELDERLY
   - Some changes are Age dependant disease which occurs as a direct consequence of physiological ageing 1. Benign prostatic hypertrophy 2. Osteoporosis
   - Some changes are age related disease. These diseases occur with increasing frequency in the elderly 1. Atherosclerotic disorders like coronary artery disease and stroke 2. Hypertension 3. Diabetes 4. Certain cancers

There is decreased functional reserve of the liver and kidneys. Decreased absorption by intestines.

2. DRUG USE IN ELDERLY
   1. Elderly suffer from multiple disorders receiving multiple drugs
   2. Aging may alter pharmacokinetics.
   3. Aging many alter pharmacodynamics of drugs

AGEING AND DRUG PHARMACOKINETICS
Increasing age may be associated with alteration in

1. Absorption of drug
   a. Reduced Gastric acid secretion - Increased gastric PH causes impaired absorption of iron and calcium
   b. Delayed gastric emptying, decreased total surface area of absorption, reduced GI Blood flow may cause delayed onset of action and/or lower serum levels of drugs necessitating dose adjustment.

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- 20% to 30% reduction in total body water content increased in increased serum levels of water soluble drugs such as lithium with increased risk of side effects
- 25% - 30% increase in body fat prolongs half life of lipid soluble drugs acting on CNS. psychotropics – increased risk of side effects
- Decreased production of albumin by liver - higher concentration of high protein bound drugs.
- Decreased liver cell mass and 35% decrease of heparin prolongs half life of lipid soluble drugs acting on CNS. psychotropics – increased risk of side effects
- Decreased activity of CYP-450 enzymes – increased risk of adverse drug – drug interactions
- Decreased phase I reactions – oxidation, reduction, hydroxylation – decreased metabolism – needing dose adjustment

2. Drug Metabolism:
   Caution while using drug with hepatic excretion.
   Avoid drugs in at causes inhibition or induction of CV P450 enzymes
   Monitor LFT

3. Drug excretion
   1. Loss of Glomeruli .2 decrease renal blood flow 3. Fall in GFR and tubular function 1% fall in GFR/year from age > 40
   Renal excreted drug needs dose adjustment

PHARMACODYNAMICS:
Elderly may respond differently to a given dose of drugs as compared to younger.
Altered drug response is due to
1. Change in receptors markers
2. Change in receptors sensitivity
3. Post receptors alterations
4. Impaired

Generally lower doses are required to achieve the same effect with advancing age

PROBLEMS ASSOCIATED WITH DRUG USE IN ELDERLY

Three major problems are
i. More prone for adverse drug events – Constipation/Hypotension/Urinary retention
ii. Higher risk of adverse drug-drug/disease interactions
iii. Non compliance

What is said is not heard,
what is heard is not understood
what is understand is not agreed upon,
agreed upon is not applied.
Applied is not at all maintained.

TO IMPROVE COMPLIANCE
1. Elderly friendly packing
2. Readable labels
3. Easily opened
4. Pill dispensing boxes
5. Affordable prices

DRUG SELECTION AND PRESCRIPTION

Prescribing for elderly is an important responsibility weigh benefits vs risks
Potential to do harm as well as good see for appropriate drug and dose selection is vital
Education and Empathy are keys to success
Good presentation is fundamental for a good doctor