******How to Learn Tables of Information

## The first part exam

This gruelling exam is a marathon of mental effort and memory. The level of work to understand and remember such a broad array of topics requires time (about 9-12 months study), discipline and great memory technique (see memory document). Often the content is best organised in tables but this can be very challenging to learn.

In this document I will outline a few tips and tricks to learn the most difficult tables

## Take this *initimidating* opioid table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Morphine | Pethidine | Fentanyl | Sufentanil | Alfentanil | Remifentanil |
| Intro |  |  |  |  |  |  |
| Pharmaceutics | | | | | | |
| Presentation | Clear colourless solution CCS  For iv, spinal, epidural, im, tablet and liquid | CCS  And tablets | CCS | CCS | CCS | White crystalline powder containing glycine- - reconstitute with water |
| Pharmacokinetics | | | | | | |
| Absorption | Weak base  pKa 7.9  25% unionized at pH7.4  30% oral bioavailable | Weak base  pKa8.5  5% unionized  50% oral bio | Weak base  pKa 8.4  10% unionized | Weak base  pKa 8  20% unionized | Weak base  pKa 6.5  90% unionized | Weak base  pKa 7.3  70% unionized |
| Distribution | Low lipid solubility  Octanol:buffer 1  30% protein binding  Vd 3l/kg  T1/2Keo 15-30min | Mod Low lipid solubility  Octanol:buffer 40  60% protein binding  Vd 4l/kg | High lipid solubility  Octanol:buffer 800  85% protein binding  Vd 4l/kg  T1/2Keo 6min | Very high lipid solubility  Octanol:buffer 1500  93% protein binding  Vd 2l/kg  T1/2Keo 6min | mod lipid solubility  Octanol:buffer 150  90% protein binding  Vd 0.5l/kg  T1/2Keo 0.5-1min | Mod low lipid solubility  Octanol:buffer 20  70-90% protein binding  Vd 0.5l/kg  T1/2Keo 1-1.5 |
| Metabolism | Hepatic  +renal  M3G (75%)- neuroexcitatory  M6G (10%)- analgesia | Hepatic (CYP2D6)  Norpethidine  (1/2 as potent, convulsant) | Hepatic CYP3A4  Norfentanyl then hydroxylation  to inactive metabolites | Hepatic CYP3A4  Desmethyl sufentanil (active) | Hepatic CYP3A4  noralfentanil | Non specific blood and tissue esterases  inactive |
| Elimination | Clearance 15ml/kg  T1/2β 2-4hrs | Clearance 15ml/kg  T1/2β 3-4hrs | Clearance 15ml/kg  T1/2β 3-6hrs  CSHT at 4hrs 260min | Clearance 15ml/kg  T1/2β 2-3hrs  CSHT at 4hrs 30min | Clearance 7ml/kg  T1/2β 1.5hrs  CSHT at 4hrs 60min | Clearance 60ml/kg  T1/2β 10mins  CSHT 4min independent of duration |
| Pharmacodynamics | | | | | | |
| CNS | Inhibitory  Sedation  Analgesia  Resp depression  Excitatory  Meiosis  Euphoria  Nausea  Truncal rigidity | Inhibitory  Sedation  Analgesia  Resp depression  Excitatory  Meiosis  Euphoria >morph  Nausea <morph  Truncal rigidity | Inhibitory  Sedation  Analgesia  Resp depression  Excitatory  Meiosis  Euphoria  Nausea  Truncal rigidity  Seizure like activity | Inhibitory  Sedation  Analgesia  Resp depression  Excitatory  Meiosis  Euphoria  Nausea  Truncal rigidity  Seizure like activity <fent | Inhibitory  Sedation  Analgesia  Resp depression  Excitatory  Meiosis  Euphoria  Nausea  Truncal rigidity | Inhibitory  Sedation  Analgesia  Resp depression  Excitatory  Meiosis  Euphoria  Nausea  Truncal rigidity |
| CVS | Hypotension (histamine)  Bradycardia (vagal) | Hypotension (histamine)  tachycardia (atropine like)  contractility | CV stable  No histamine  Bradycardia (vagal)  Obtunds CV response to laryngoscopy | no histamine  Bradycardia (vagal)  Obtunds CV response to laryngoscopy | no histamine  Severe Bradycardia (vagal)  Obtunds CV response to laryngoscopy | no histamine  Severe Bradycardia (vagal)  Obtunds CV response to laryngoscopy |
| RESP | Potent resp depression  Obtunds airway reflexes  Bronchospasm (histamine)  Antitussive  Impairs ciliary activity  RR TV apnoea  response to PaCO2 and PO2 | Potent resp depression  Obtunds airway reflexes  Bronchospasm (histamine)  **Not** Antitussive  Impairs ciliary activity  RR TV apnoea  response to PaCO2 and PO2 | Potent resp depression  Obtunds airway reflexes  Antitussive  Impairs ciliary activity  RR TV apnoea  response to PaCO2 and PO2 | Potent resp depression  Obtunds airway reflexes  Antitussive  Impairs ciliary activity  RR TV apnoea  response to PaCO2 and PO2 | Potent resp depression  Obtunds airway reflexes  Antitussive  Impairs ciliary activity  RR TV apnoea  response to PaCO2 and PO2 | Potent resp depression  Obtunds airway reflexes  Antitussive  Impairs ciliary activity  RR TV apnoea  response to PaCO2 and PO2 |
| GIT | Constipation  gastric emptying | Constipation  gastric emptying | Constipation  gastric emptying | Constipation  gastric emptying | Constipation  gastric emptying | Constipation  gastric emptying |
| Genitourinary | Urinary retention | Urinary retention | Urinary retention | Urinary retention | Urinary retention |  |
| Skin | pruritis | pruritis |  |  |  |  |
| Other |  | Inhibits post anaesthesia shivering  Severe hypertension with MAOi |  |  |  |  |
|  |  |  |  |  |  |  |

## How do you eat this elephant?

Well the answer is apparently ***one bite at a time***, so let’s use that as a start.

Tip 1: Visual memory is your most powerful memory

For example ***pharmaceutics*** is easy because remembering an image is far easier than remembering just words. So ***imagine*** ***that vial of morphine***, 10mg/ml in a clear colourless solution. Fortunately most of the rest are also *clear colourless solutions*.

Tip 2: Memorise the categories

Frameworks are pervasive throughout medicine and for good reason. Imagine trying to memorise and communicate your assessment without history, examination, investigations. Or trying to remember your CVS/resp exam without inspection, palpation, percussion, auscultation.

Memorising the headings and subheadings for pharmaceutics, pharmacokinetics and pharmacodynamics will be one of the most useful things you memorise for this exam. So take the time to learn:

ADME - absorption, distribution, metabolism and elimination.

Within distribution take the time to learn lipid solubility, protein binding and volume of distribution and so on.

Given an unfamiliar medication, you may just be able to write something (even qualitatively) under each heading to gain a few marks.

Tip 3: Most meds in the same class have very similar profiles

Look at **pharmaceutics** or any of the **pharmacodynamics** profiles. All of the opioids have pretty much the same characteristics. So instead of learning 6 different datasets you are really learning just one.

Again harness that *visual memory* and your *past experience*. Imagine the CNS, CVS, resp, GI and GU effects of every patient you’ve given an opioid to. It’s not hard to imagine a patient post total knee replacement. His knee bandaged, he’s happily been pressing that morphine PCA. He’s sedated, slightly euphoric with meiotic pupils, and an incredibly low resp rate and you're constantly being called to help with constipation and urinary retention. It’s a hard imagine to forget!

Tip 4: look for the outlier/the standout/the unique characteristic

For example, look at pKa and unionized fractions. Instead of memorizing each number you can generally say that all of them have low unionized fractions except alfentanil and remifentanil. These 2 are the outliers and probably worth memorizing the values as they impact significantly on their speed of onset.

How about lipid solubility? Yes fentanyl and sufentanil are clear outliers that significantly impact on their use (rapid offset due to redistribution).

So go through the table and highlight all the outliers.

Tip 5: Memorise each category.

I confess that I did write these tables out in my spare time. While I was able to recall an incredible number of facts, this was not a great return on investment for the exam. Doing previous MCQs and SAQs will guide you to focus on the medications and facts that require more detailed memorisation without devoting wasted time to facts that aren’t commonly tested.

That said if you want to memorise this table just write it out 20 times. Easy.

An important method is to memorise/write it across each category from left to right. For example I wrote the pKa for all the meds, then moved on to write unionized fractions, then lipid solubility then protein binding and so on.

This allows your brain to compare similar numbers and make links between them. If you were to write down each fact for morphine, then pethidine, then fentanyl and so on, it would take far more time to memorise. Try it out!

Tip 6: Memorise the middle

|  |  |  |
| --- | --- | --- |
| **Severity** | **Mean gradient (mmHg)** | **Aortic valve area (cm2)** |
| Mild | <25 | >1.5 |
| Moderate | 25-40 | 1-1.5 |
| Severe | >40 | <1 |

Look at this table for severity of aortic stenosis. Medical disease is often broken up into 3 categories of mild, moderate and severe whether is valve disease, or Child Pugh (A, B, C) in liver disease as just 2 examples.

Instead of memorizing each number in each box, ***you really just have to remember 25-40 and 1-1.5***

These numbers define moderate, so either side must be mild and severe. Easy less data points to remember means better recall.

## If you have comments or tips that you use, please let us know!