

Nutrition issues as the oncall registrar

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Conflicts of Interests Declaration

- Speaker fees: Abbvie, Pfizer, Dr Falk Pharma UK

Content

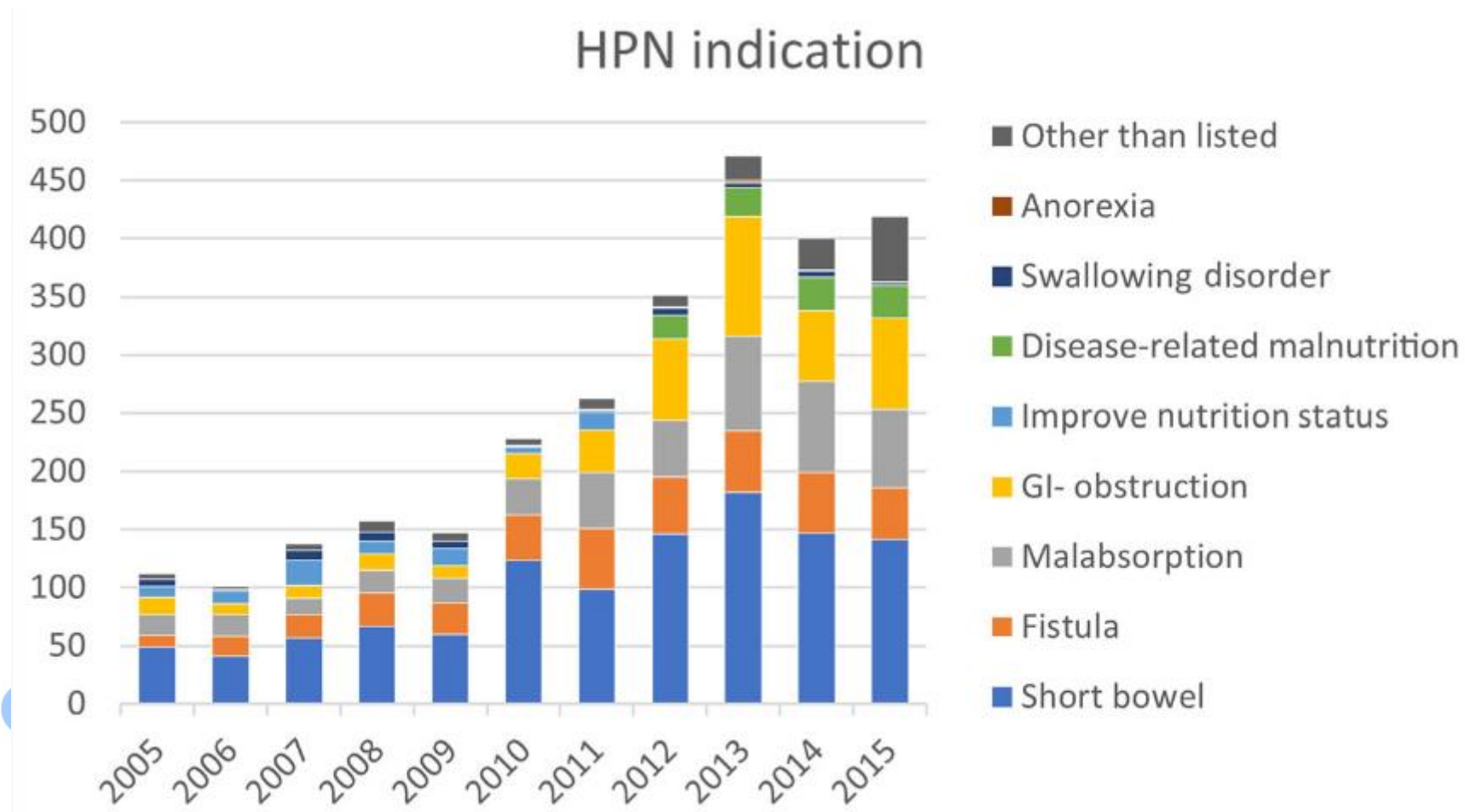
What we have covered so far:

- ✓ Malnutrition screening
- ✓ Refeeding syndrome
- ✓ Eating disorders and MEED
- ✓ Obesity
- ✓ High output stoma
- ✓ Enteral feeding
- ✓ Troubleshooting the feeding tube

What I will cover:

- Understanding of Intestinal failure
 - Making sense of the anatomy
- The Septic PN patient
 - Making sense of the PN prescription
 - Hydration assessment
 - Managing the central line

Intestinal failure: why do I need to know this?



Intestinal failure: define it

- Reduction of gut function to below the minimum necessary for the absorption of macronutrients and/or water and electrolytes
- IV supplementation is required to maintain health/growth

Intestinal failure: classifying it

- Pathophysiology:
 - Five main groups
 - Short bowel, Intestinal Fistula, Intestinal Dysmotility, Mechanical obstruction and Extensive small bowel mucosal disease

- Functional classification:

Type 1

Acute self-limiting
Days to weeks
E.g. post-op ileus

Type 2

Prolonged
Weeks to months
Complex GI surgery
E.g. Fistula, Ischaemia

Type 3

Long term
Months to years
Metabolically stable
E.g. motility, short bowel

Short bowel: the basics

- Definition: Less than 200cm in length of small bowel

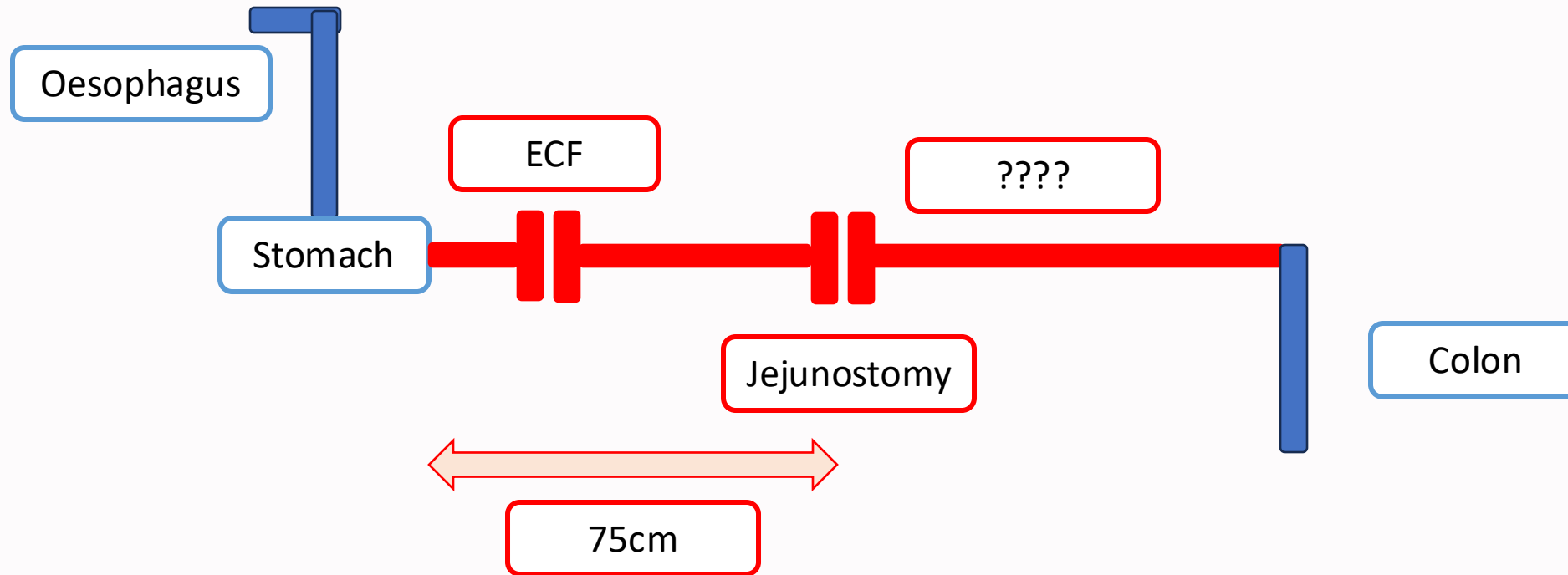
How do I make sense of this clinically?!

Case

- Mr Smith is a 70 year old gentleman who has been referred by the surgeons following emergency surgery for the mesenteric ischaemia. He has an enterocutaneous fistula at 15cm from the DJ flexure, a jejunostomy at 75cm. He has had a length of small bowel resected.
- Can you please see as he needs gastro input and needs to start PN?



Residual bowel anatomy schematic



Case

- Mr Smith re-presents to his local AE with pyrexia of unknown origin.
- He was discharged home on parenteral nutrition via a tunnel line
- His observations: SBP: 75/45, HR: 150, T: 39,



Septic PN patients

- Stop feeding through the line
- Will need peripheral access
- IV fluids (typically matched to the volume of PN) + electrolytes
- Peripheral and Central blood cultures
- Antibiotics: refer to local policy; given through the central line



Matching PN Volume and Electrolytes

- At highest risk of dehydration and salt loss

Component	Amount
Volume	3.5L
Na mmol	140
K mmol	40
Magnesium mmol	8

Matching PN Volume and Electrolytes

Composition of commonly used crystalloids

Content	Plasma	Sodium chloride 0.9%*	Sodium chloride 0.18%/ 4% glucose ^a	0.45% NaCl/ 4% glucose ^a	5% glucose ^a	Hartmann's	Lactated Ringer's (USP)	Ringer's acetate	Alternative balanced solutions for resuscitation**	Alternative balanced solutions for maintenance**
Na ⁺ (mmol/l)	135–145	154	31	77	0	131	130	130	140	40
Cl ⁻ (mmol/l)	95–105	154	31	77	0	111	109	112	98	40
[Na ⁺]:[Cl ⁻] ratio	1.28–1.45:1	1:1	1:1	1:1	-	1.18:1	1.19:1	1.16:1	1.43:1	1:1
K ⁺ (mmol/l)	3.5–5.3	*	*	*	*	5	4	5	5	13
HCO ₃ ⁻ / Bicarbonate	24–32	0	0	0	0	29 (lactate)	28 (lactate)	27 (acetate)	27 (acetate) 23 (gluconate)	16 (acetate)
Ca ²⁺ (mmol/l)	2.2–2.6	0	0	0	0	2	1.4	1	0	0
Mg ²⁺ (mmol/l)	0.8–1.2	0	0	0	0	0	0	1	1.5	1.5
Glucose (mmol/ l)	3.5–5.5	0	222 (40 g)	222 (40 g)	278 (50 g)	0	0	0	0	222 (40 g)
pH	7.35–7.45	4.5–7.0	4.5		3.5–5.5	5.0–7.0	6–7.5	6–8	4.0–8.0	4.5–7.0
Osmolarity (mOsm/l)	275–295	308	284		278	278	273	276	295	389

* These solutions are available with differing quantities of potassium already added, and the potassium-containing versions are usually more appropriate for meeting maintenance needs.

** Alternative balanced solutions are available commercially under different brand names and composition may vary by preparation.

^a The term dextrose refers to the dextro-rotatory isomer of glucose that can be metabolised and is the only form used in IV fluids. However IV fluid bags are often labelled as glucose so only this term should be used. Traditionally hospitals bought a small range of fluids combining saline (0.18-0.9%) with glucose but several recent NICE/NPSA documents have recommended specific combinations, which are now purchased to enable guidelines to be followed. Glucose-saline combinations now come in 5 different concentrations, and the addition of variable potassium content expands the pre-mixed range to 13 different products. Prescribers must therefore specify the concentration of each component; the term dextrose-saline (or abbreviation D/S) is meaningless without these details. What is specified also impacts significantly on the cost of the product.

Note: Weight-based potassium prescriptions should be rounded to the nearest common fluids available (for example, a 67 kg person should have fluids containing 20 mmol and 40 mmol of potassium in a 24-hour period). Potassium should not be added to intravenous fluid bags as this is dangerous.

Source: This table was drafted based on the consensus decision of the members of the Guideline Development Group.

'Intravenous fluid therapy in adults in hospital', NICE clinical guideline 174 (December 2013. Last update December 2016)

Matching PN Volume and Electrolytes

- At highest risk of dehydration and salt loss


Component	Amount
Volume	3.5L
Na mmol	140
K mmol	40
Magnesium mmol	8

- 0.45% NaCl/4% dextrose 1L with 20mmol KCL in each bag x2
- 5% glucose 1L with 8mmol Mg
- 5% glucose 500ml

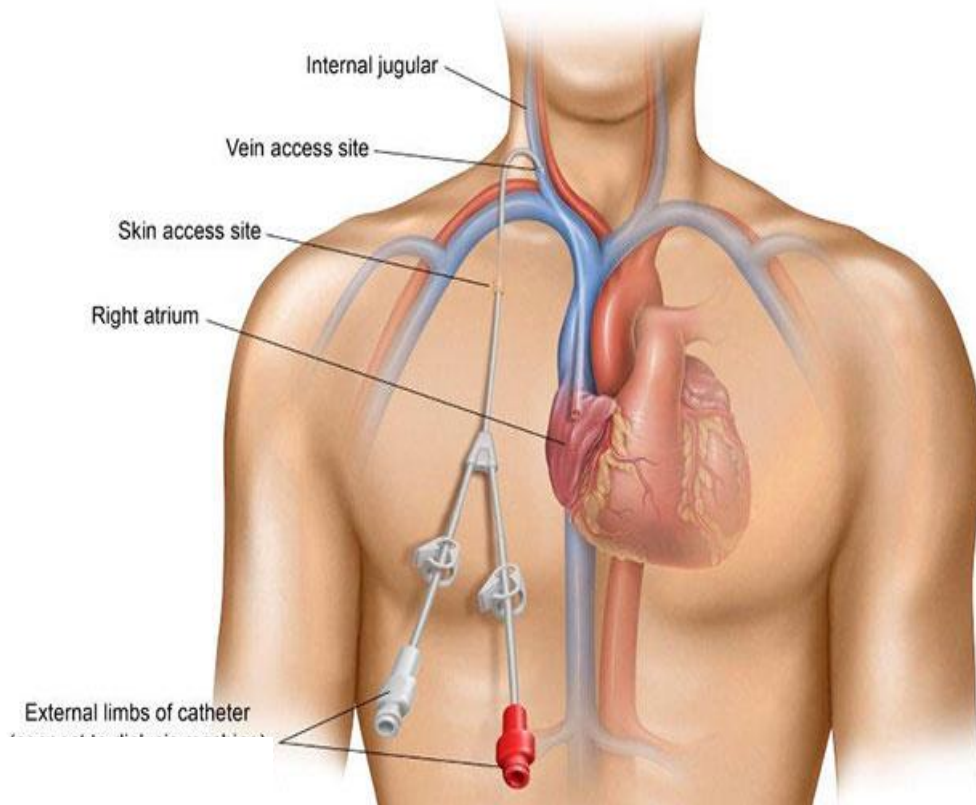
.....rate matched to total rate of PN



Assessing hydration and electrolytes

- Usual:
 - Fluid balance
 - Urine output per hour
 - Oral mucosa, CRT
 - Postural blood pressure
 - Weight!
 - 1kg is equivalent to 1L of fluid
 - Changes in weight by 1-2kg over 24 hours most likely represents fluid balance
 - Urinary sodium
 - < 20mmol/L may represent under hydration
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What about the tunnel line?

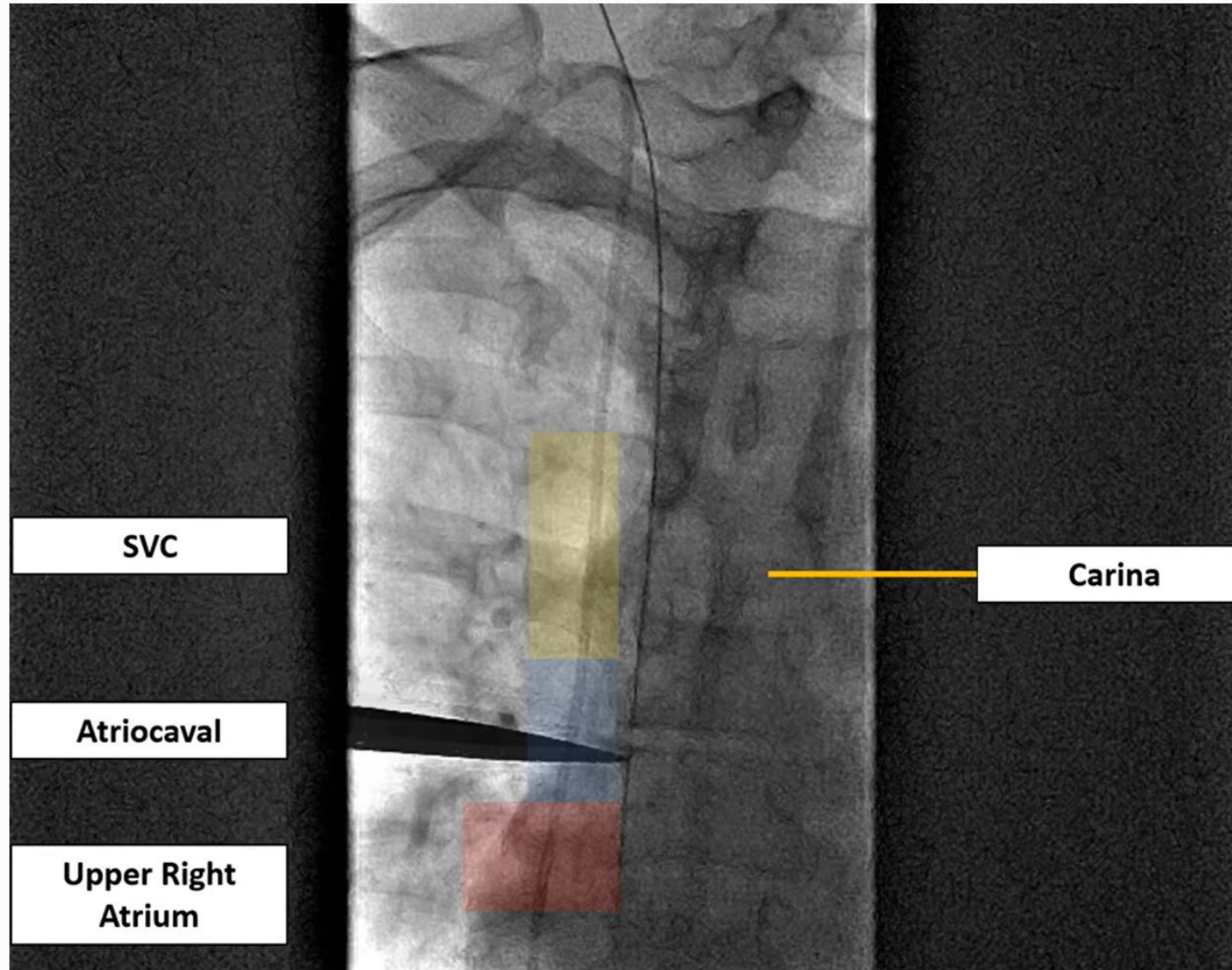


Is the tunnel line the same as Hickman line?



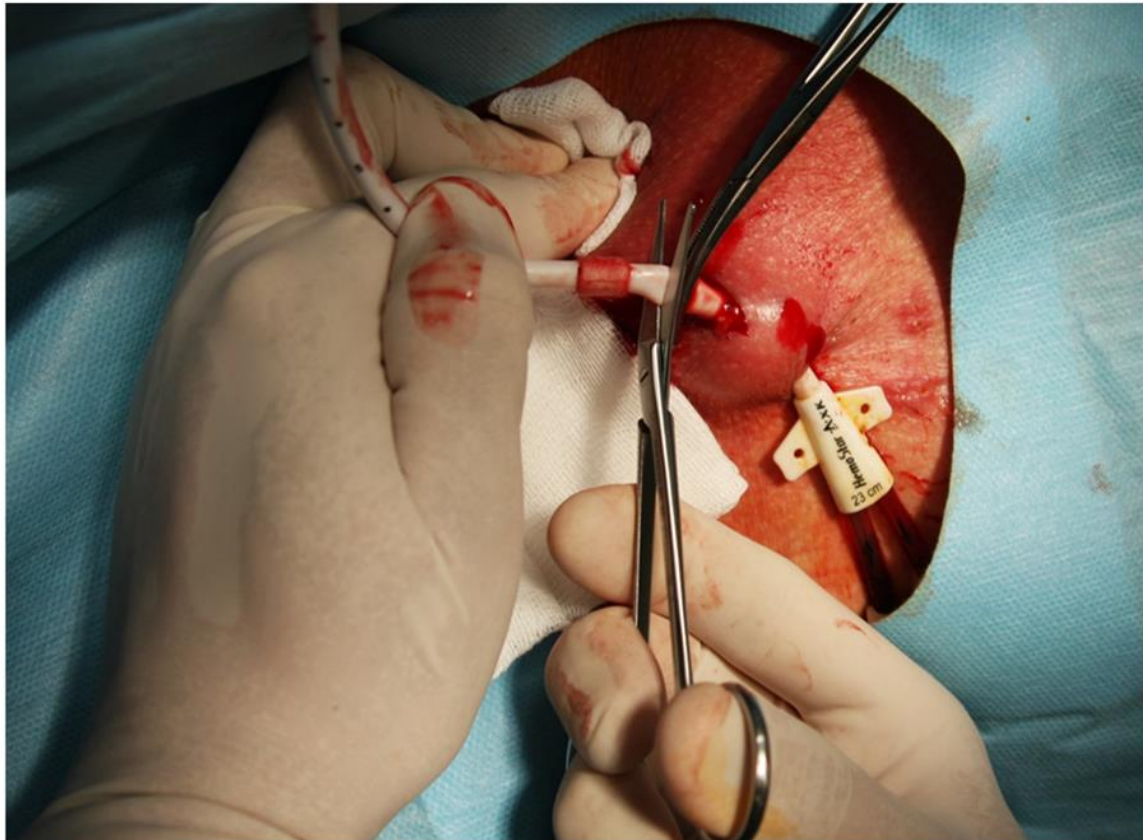
- Hickman is a brand name for a type of tunnelled CVC
- There are other brands: Groshong, Broviac and Leonard

Checking the line site



Removing the line

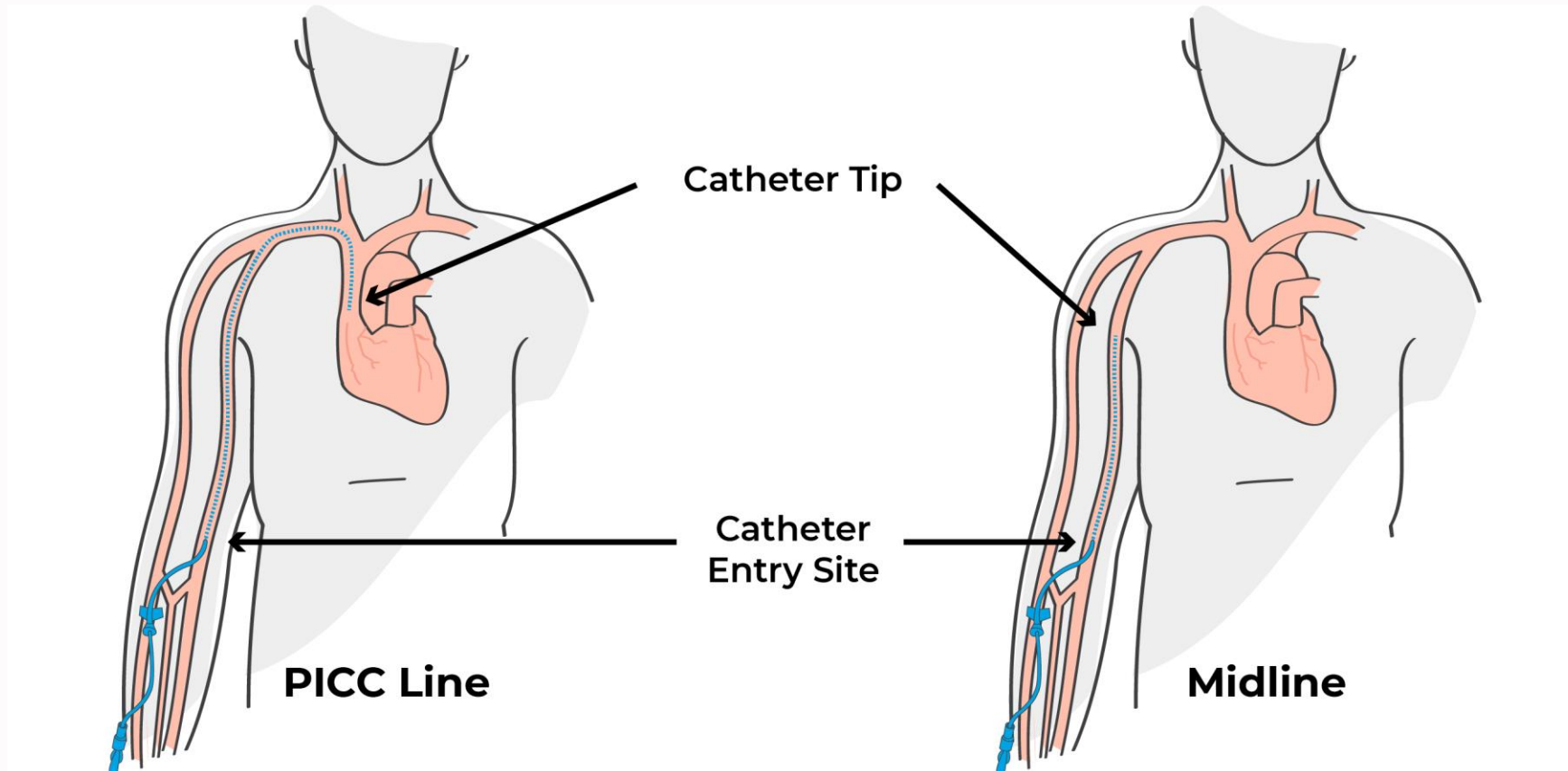
If despite initial resuscitation, remains in septic shock then line should come out



General surgeon on call

IV access for antibiotics and fluids

Other access



Take-away messages

- Use of residual bowel anatomy schematic diagrams
- How to prescribe replacement fluids and re-assess hydration status in a PN dependent patient
- How to manage tunnelled lines in sepsis