Parenteral Nutrition in the Hospitalized Patient: which VAD, which policies?

Rob Dawson

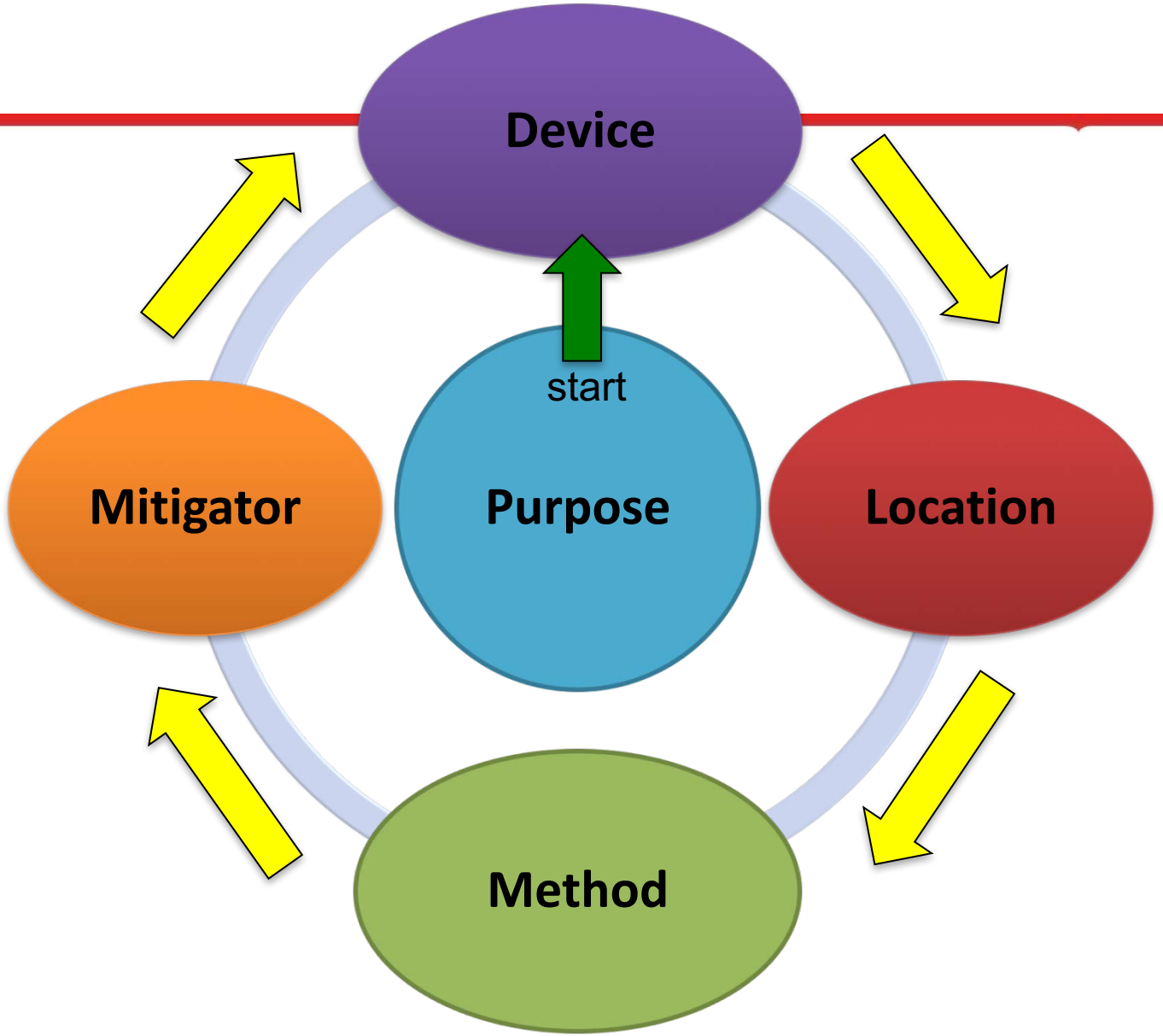
DNP, MSA, APRN, ACNP-BC, VA-BC

USA

Disclosure

- Consultant, Vascular Access Consultants LLC:
  - Analogic, Inc / BK Ultrasound
  - B. Braun
  - Velano Vascular
  - Parker Labs
  - Eloquest
  - Independent work in legal and quality improvement

Conceptual Framework for Vascular Access



(Dawson, 2012)

Choosing a Device

- Tip Position !
- Tip Position !
- Tip Position !

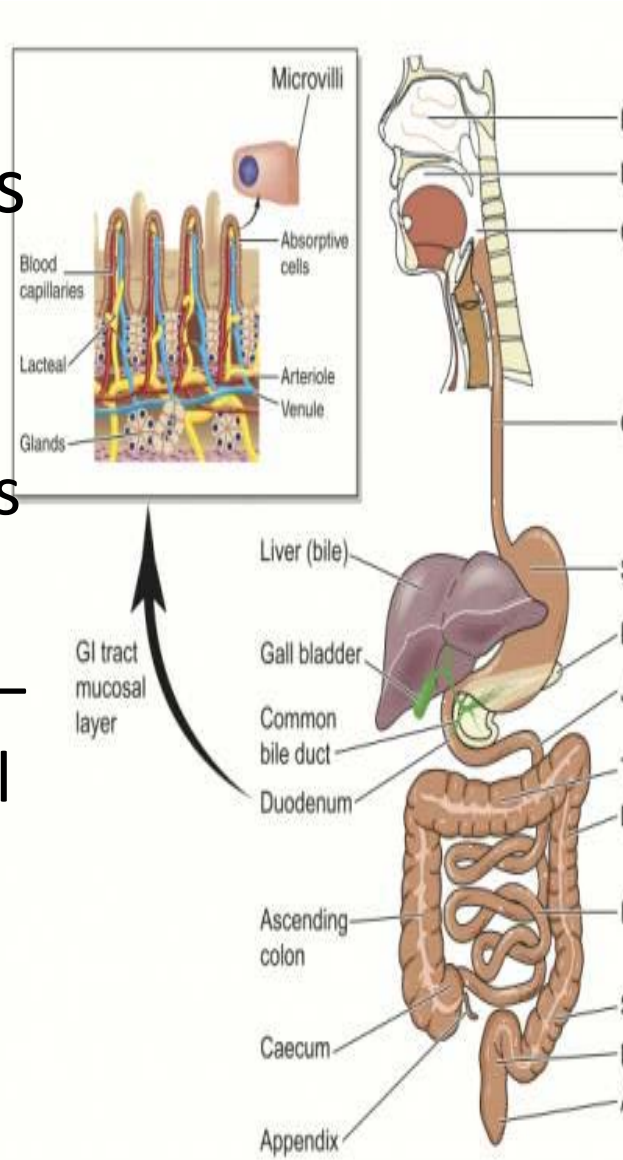
Based on infusion characteristics and length of need

Parenteral Nutrition

- PPN vs TPN
- Partial or Peripheral Nutrition?
  - Either one seems appropriate
  - Concencentration should be 900 mOsmols/liter or less for periphreal infusion (INS, 2016)
- T = Total Parenteral Nutrition
  - Concentration >900 mOsmols/liter, but varies

Who gets PN?

- Ideally no patient needs or recieves PN in the hospital setting
  - However it is preferred to first go enterally –(into the gut) – safer – less risk – better immune function
  - The gut is the largest immune organ – needs to work and be fed to stay well functioning



The Gut is Vital to Health

- Our intestines contain more immune cells than the entire rest of our body.
- "The human gut plays a huge role in immune function," …"This is little appreciated by people who think its only role is digestion.

Dr. Natalia Shulzhenko, https://www.sciencedaily.com/releases/2013/09/130916122214.htm

Who gets what type of PN?

- If PN is needed in the hospital

  1. Does the gut work at all? IF so, some enteral and some parenteral could be best

  2. IF gut is not working at all, and still needs nutrition, PPN vs. TPN

     - Depends on nutrition requirement and length of need
     - Less than one week – generally considered for PPN
     - More than one week – TPN is likely and often about 7 -10 days

Complications of PN

- Vascular Access related:
  - Insertion related / mechanical
  - Infection
  - Thrombosis
- Parenteral Nutrition
  - Metabolic and electrolyte imbalances

Preventing Complications

- VAD related complications with PN are the same concerns if VAD were used for other reasons
  - Proper insertion, site selection and technique (Method) that is best way to prevent complications
  - Care and maintenance with appropriate asepsis
    - Change tubing daily
    - Disinfect connector and ports prior to use
    - Site care, dressing changes
    - Use of filters

Preventing Complications

IF no contamination of VAD through insertion and maintenance, would be hard to:

1. Get an infection
2. Blame the VAD

- Certainly other portals may exist and the VAD may get seeded, and or may be removed or blamed for the infection

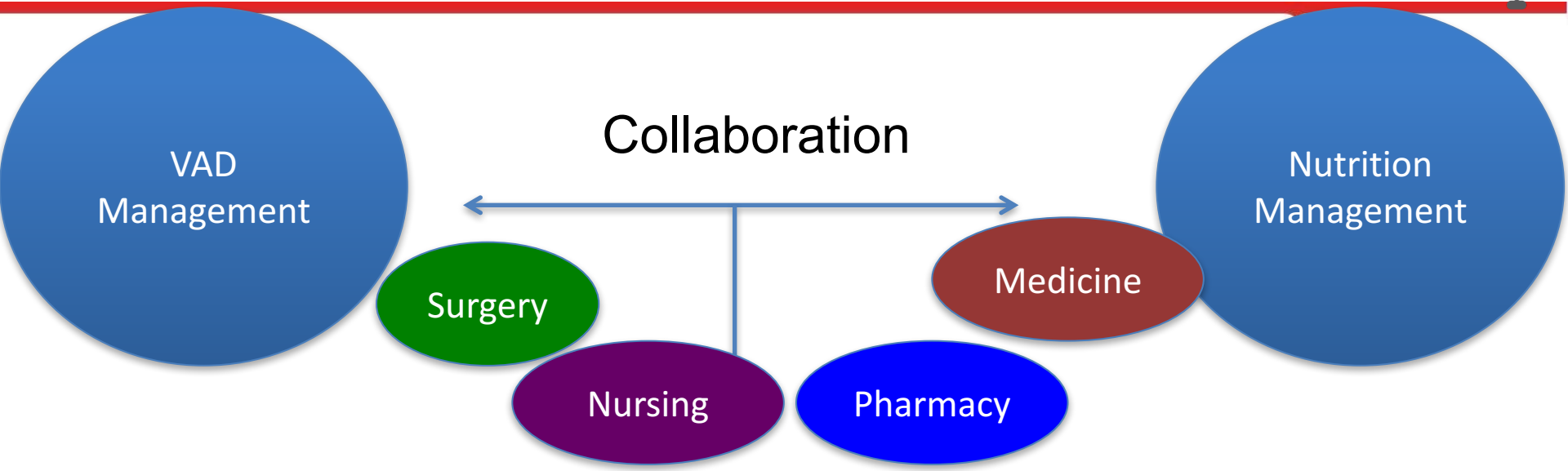
Preventing Complications

- Systematic approach with a Patient Focus
  - 1. Only patients that really need PN get VADs for PN
  - 2. Daily needs assessment for both PN and VAD to remain active
  - 3. Stop TPN and remove VAD as soon as possible
  - 4. The insertion and selection of VAD should be based evidence driven checklist, bundles, with dedicated professionals

Preventing Complications

- The TPN / PPN decisions should also be systems based, driven by evidnece
- Managing PN and VADs needs to be collaboration, a Team approach

Systems Approach



Systems based interventions and monitoring

VAD Insertion and Daily Assessment Program

Outcomes Monitoring

Which VAD?

- Short Term
  - Less than 10 days
- Medium Term
  - Less 6 weeks
- Long Term
  - Indefinite

Which VAD

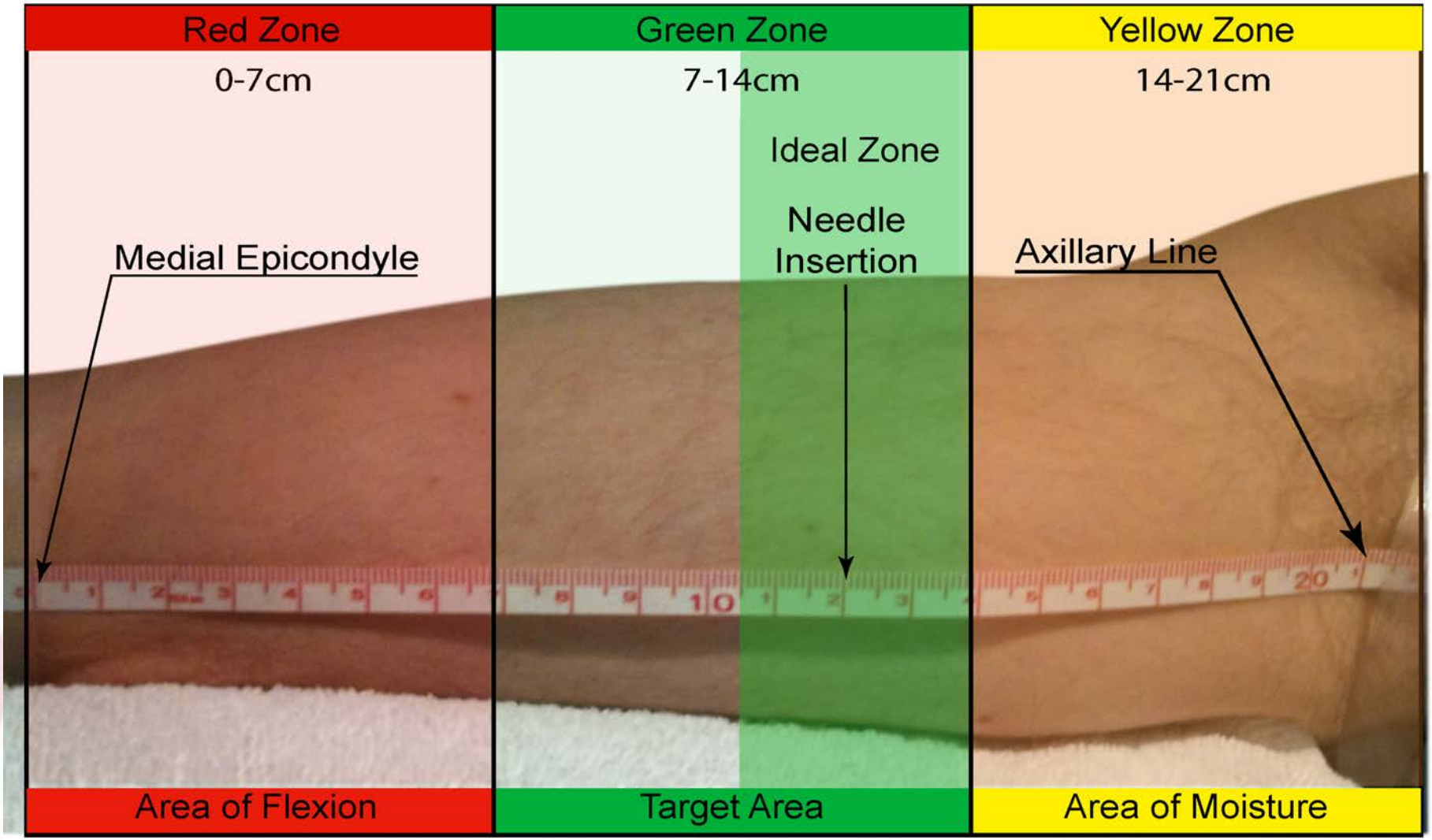
- Short Term
  - PPN – Any device could work
  - If central, then non tunneled or short tunnel
  - If peripheral Midline or even PIVC

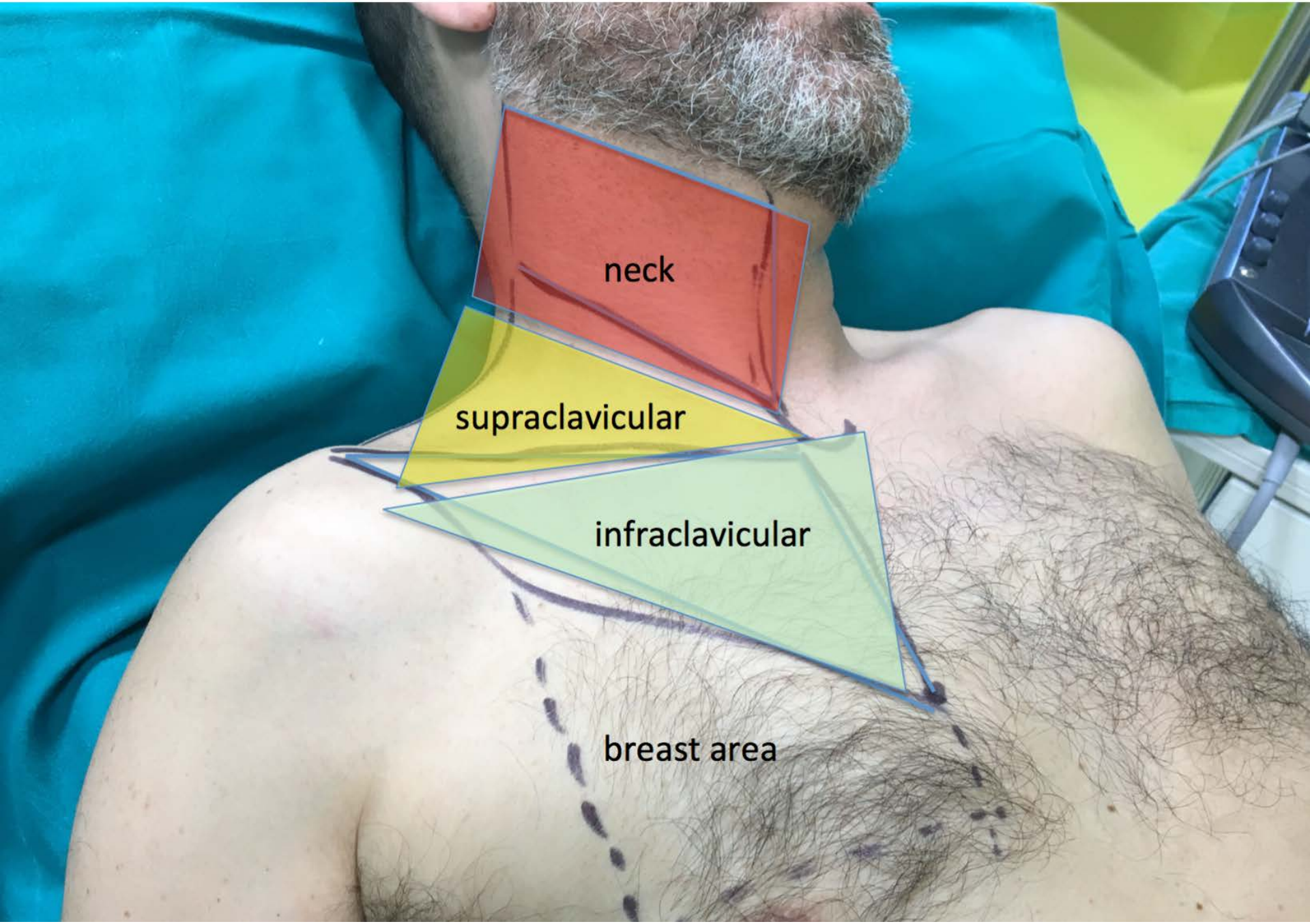
Which VAD?

- Medium term
  - TPN and Central
  - Consider VAD on principal of best
    - Device and Site given patient factors, resources and skill
    - Consider the non-cuff tunnel
    - Consider the tunneled PICC

Site Selection System

ZONE INSERTION METHOD (ZIM)




neck
supraclavicular
infraclavicular
breast area

Guidelines

- ESPEN 2009

ESPEN Guidelines on Parenteral Nutrition: Central Venous Catheters (access, care, diagnosis and therapy of complications)

Mauro Pittiruti [a], Helen Hamilton [b], Roberto Biffi [c], John MacFie [d], Marek Pertkiewicz [e]

- ASPEN 2009

Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient:

Special Notes

- Review ESPEN 2009 and ASPEN 2009
- INS 2016 Standards
- ESPEN 2009 PPN 850 mOsmols/l
- INS 2016 PPN 900 mOsmols/l
- ESPEN 2009
  - Lipids may have a protective effect for PPN infused in peripheral veins
- Might delay nutrition with active infection
- Consult nutrition expert prior to VAD

Oncology Perspective

Many suffering from cancer have compromised venous access viability due to disease, or related to surgical treatment of disease, such as poor nutritional status leading to weight loss, amputation, edema, or infection. These patients require patent intravenous access for both phlebotomy and administration of chemotherapy, and often, after repeated attempts, access cannot be established.

Jocelyn Farrell, R.N.
Staff Nurse, Dr. H. Bliss Murphy Cancer Center.

American Cancer Society

The type of CVC you need depends on:

- How long you'll be getting treatment
- How long it takes to infuse each dose of chemo
- How many drugs need to be given at once
- Your preferences
- Your doctor's preferences
- The care required to maintain the CVC
- Cost
- Other medical problems you may have, for instance clotting problems or lymphedema (swelling)

Michele Di Giacomo's approach

PICCs in bone marrow transplant patients should be tunneled:

- BMT patients have a high risk of CRBSI, due to prolonged period of neutropenia typical of this condition: tunneling is known to protect from extraluminal contamination
- BCSH guidelines recommend tunneled central lines in BMT patients

(Pittiruti, 2014)

First clinical study: DiGiacomo Poster at NIVAS conference 2011

TUNNELED PERIPHERALLY INSERTED CENTRAL CATHETERS FOR CANCER PATIENTS: A SIMPLE TECHNIQUE FOR PROLONGED INDWELLING CENTRAL CATHETERS IN HAEMATOLOGY PATIENTS.

Michele Di Giacomo, MSN (cancer), BSN(Hon), IP Advanced Nurse Practitioner - HCA at UCLH , HCA NHS Venture, London (UK)

Introduction:

Central venous catheter (CVC) related sepsis rates among cancer patients range from 3.8% to 28.8%.[1,2] CVC sepsis rates associated with bone marrow transplant recipients are considerably higher than among non-bone marrow transplant patients [3,4]. The difference in rates between these groups is thought to be because of the prolonged neutropenic period experienced by individuals undergoing bone marrow transplants.

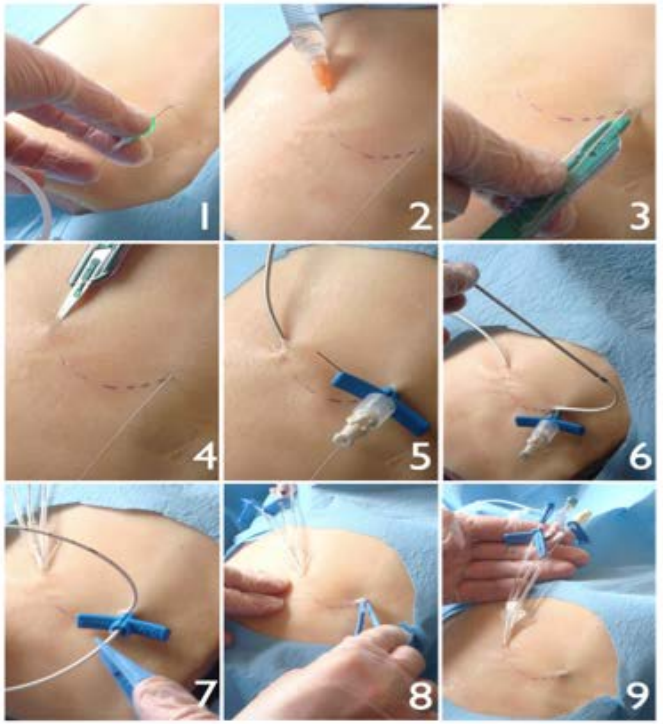
Measures to control sepsis can be grouped into the following categories: measures directed against the reservoir; measures that interrupt transmission of organisms; and measures that reduce host susceptibility. It has been hypothesized that the PICC line site may act as a reservoir for pathogenic organisms. The purpose of this study was to test whether CVC related sepsis could be reduced by proximal tunneling of the PICC at the exit site. The primary endpoint was the rate of CVC related sepsis, defined as a positive blood sample (same organism in catheter and peripheral samples) in the presence of an elevated temperature.

Materials and Methods:

This randomized trial was open to patients from a large cancer hospital in North London between age 18 and 75 who had life expectancies of 6 months or more, were receiving their first CVC, were available for follow-up, were visually and cognitively competent, and were able to read and write English. All individuals in this study received a 6 Fr double lumen PICC. Patient gender and age for both groups are summarized below:

GENDER	NON TUNNELED PICC	TUNNELED PICC
MALE	6	5
FEMALE	4	5

AGE	NON TUNNELED PICC	TUNNELED PICC
31-40	5	4
41-50		3
51-60	4	2
61-70	1	1



WoCoVA
4th World Congress on Vascular Access

Considerations for VADs in Cancer

- Power injection needs
- Flow rates
- Surgery
- Cost
- Available resources for care and complication management
- Body image
- Nutritional needs – expected weight loss
- Blood products
- Lifestyle choices – active, swimmer, fashion

Cancer and VADs

(Camp – Sorrell, 2004)

Access Types

- PIV Catheter
  - Hospital based, short term
  - Limited dwell
- PICC
  - Percutaneous
  - Multilumen, might be preferred for 6 months or less
- PICC ports
  - Implanted under skin
  - Cosmetic concerns could be a factor

Access Types

- Tunneled
  - Multi lumen
  - Easier removal
  - Indefinite dwell
- Port
  - Single or double
    - Consider catheter diameter and maintenance
    - Indefinite dwell
    - Surgical removal
    - Advantage or needle removal and no exterior material
  - Concern for skin erosion
    - Nutritional status
    - Expected weight loss

Thank you

Rbdawson@me.com