National Institutes of Health
Clinical Center

# A Novel Approach to Pain Management in Sickle Cell Population

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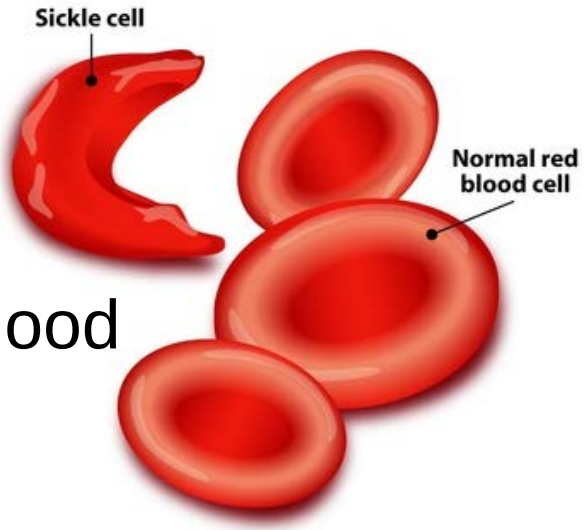
# Objectives

Following this presentation attendees will be able to:

- State three standard of care treatments for a patient in sickle cell crisis
- Identify four routes used for pain management during sickle cell crisis
- Describe three aspects for site selection and management in subcutaneous access for pain management
- State three benefits for use of subcutaneous pain management via patient controlled analgesia infusion

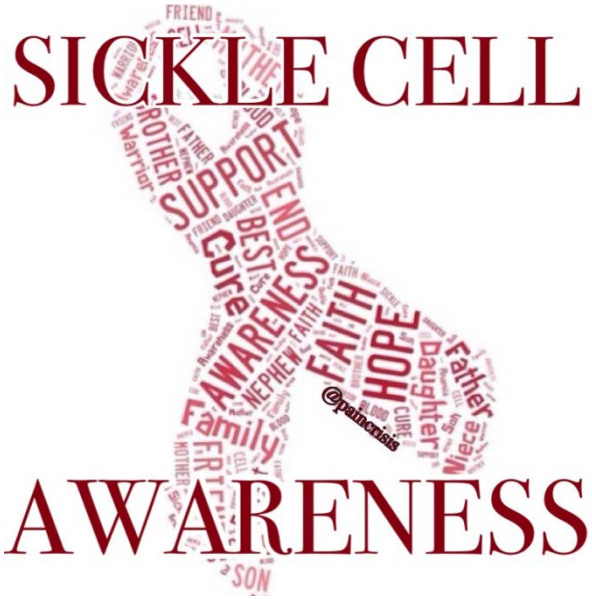
# Sickle Cell Disease (SCD)




- Inherited blood disorder affects red blood cell (RBC)
- Cells contain hemoglobin S
  - Do not live as long as normal RBC's
  - May become stiff and change shape (sickle)
    - Difficulty passing through the blood vessels
    - Decreased oxygen to tissue, organs and bones
    - Leads to vaso-occlusive crisis

# Factors that can Precipitate Crisis

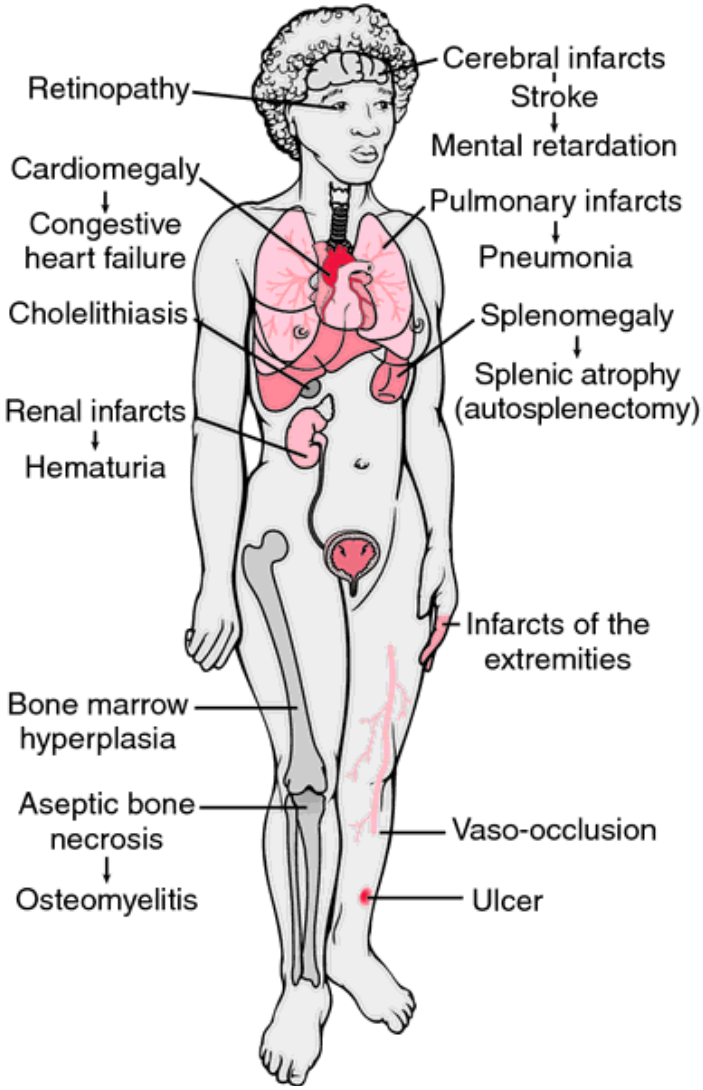
- Dehydration
- Infection
- Fever
- Hypoxia (decrease in oxygen to body tissue)
- Bleeding (heavy menstruation)
- Over-exertion fatigue
- Cold exposure
- Drug and alcohol use
- Stress
- Pregnancy



# Vaso-occlusive Crisis

Due to decrease vascularization, crisis may present as:

- Lungs - acute chest syndrome
- Bones - avascular necrosis
- Muscles and joints - pain crisis
- Increased risk for strokes, organ damage, priapism, pulmonary hypertension, infections and severe open wounds

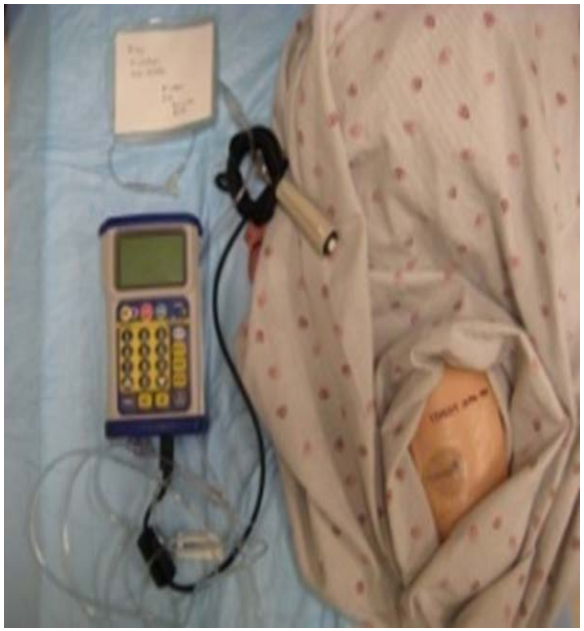


# Pain in SCD

- Chronic
  - Managed with long and short acting narcotics
  - Nutrition
  - Medications designed to decrease hemoglobin S or increase RBC's
- Acute
  - emergent medical condition
  - management via oral (PO), intramuscular (IM), continuous intravenous (IV) infusion, and IV or subcutaneous (SQ) patient-controlled analgesia (PCA)
  - adequate hydration, oxygen therapy, antibiotics, blood products

# Why is SQ Needed in SCD?

- Veins hard to cannulate due to dehydration, decreased blood flow, and multiple access over time
- SCD can cause avascular necrosis and deep vein thrombus (DVT)
  - difficult to place peripherally inserted central lines, further limiting vascular accessibility
- SQ access provides alternative for pain management
  - patient controlled analgesia (PCA)



# Advantages of PCA Use via SQ Access

- Ability to initiate pain management immediately upon the patient's arrival, without waiting to obtain vascular access
- IV access available for fluids, blood products, iron chelating agents, antibiotics and other medications not be compatible with opioid therapy
- Minimal risk of infiltration
- As effective as IV and IM

# Nursing Assessment/Management

- Continual assessment of the patient's pain satisfaction with treatment
  - Ask the patient to rate his/her pain level

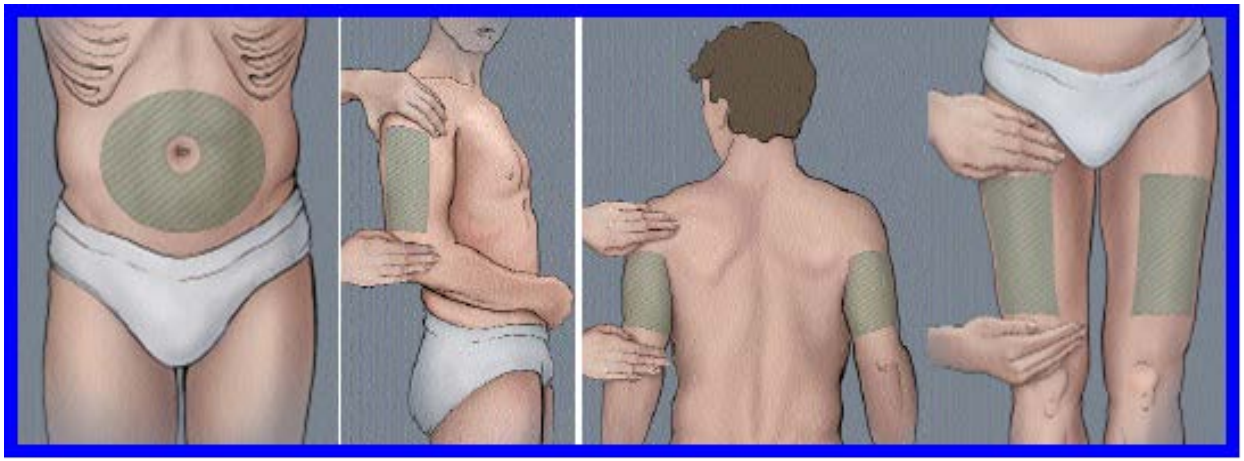
- Vital signs (include oxygen saturation and)
- Patient's ability to perform bolus dosing – assess level of consciousness (LOC)
- Documentation: PCA program and patient use
- Determine if goals of pain management, safety and satisfaction are being met
- Infusion site

# Supplies

- Medication (per medical order)
- Infusion pump (tubing, batteries, needle)
- Documentation sheet
- Dressing supplies
- Two nurse independent check
  - RIGHTs: patient, dose, route, medication and time/frequency.
  - PCA pump settings: written medical order, program settings, validating the carrier solution

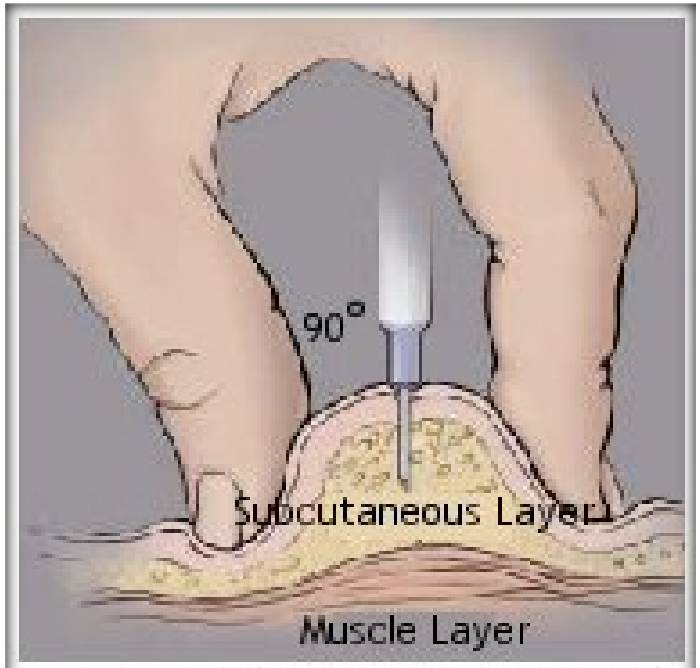
# Subcutaneous Access

- Absorbed and tolerated best utilizing the abdomen, though other sites include the back, arms and thighs
- Avoid painful or ecchymosed areas
- Enlist patient participation in site selection
- Reassess site and dressing per hospital policy



# Subcutaneous Access

- Hold needle like pencil or dart
- Grasp skin between the thumb and index finger and pinch up
- Thrust needle all the way into skin at 90 degree right angle, do not “push” needle into skin slowly or thrust into skin with great force
- Release the skin
- Dressing per institution policy



A subcutaneous injection into the fatty layer of tissue under the skin.

# Potential Complications

- Sedation – assess LOC
- Infection – continually assess site (change site per institution guidelines and with signs of irritation)
- Pruritus (locally and systemic)
  - Change site
  - Medical interventions (Benadryl®, lotions or low dose Narcan® drip)
- Equipment failure
- Nurse expertise – knowledge of process and equipment
- Patient Satisfaction – education and continual assessment

# Summary

- Patients with SCD are at risk for pain crisis
- Acute pain crisis is a medical emergency
  - Pain management, oxygen, fluids, antibiotics, blood products
  - Access for pain management (IV, IM, PO, SC)
- SQ access equal to IV, IM
- Site selection
  - Educate patient
  - Encourage patient participation in site selection
  - Avoid ecchymotic areas
  - Choose appropriate site for infusion

# Summary continued…

- Benefits of SQ PCA pain management
  - Able to initiate immediate pain treatment when IV access is difficult
  - IV access available for additional medications and treatments
  - Minimal risk of infiltration
  - As effective as IV and IM

**Pain management is vital to management of pain crisis, SQ PCA provides effective pain management**

# Questions

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