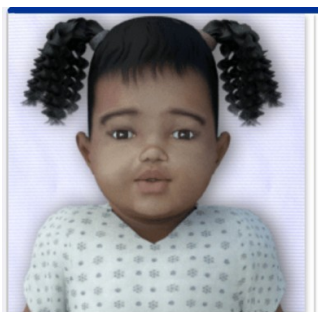


Questions and Responses

REMEMBER TO SWITCH THE CONVERSATION TO THE **MOM FIRST**



Miah Zavarro

21 months
2' 7" (79 cm)
23.0 lb (10.5 kg)

Reason for encounter
Swollen hands and feet in a 21-month-old

THESE ARE THE **KEY QUESTIONS**; Make sure you get these!

Question	Response
How can I help her today? (witness)	Her hands and feet are all swollen and I believe very painful. Both started at the same time. It's gotten progressively worse over the last two days. She doesn't want me to touch her hands. She won't pick anything up anything, and she refuses to hold anything in her hands.
Does she have any other symptoms or concerns we should discuss? (witness)	She's not eating well. Not playing. She's very quiet. And oh yeah, she says that her tummy hurts, and it does look a little swollen to me too. She doesn't want me to touch her there either.
Any problem moving her hand(s)? (witness)	Yes. I can tell it hurts her to move her hands.
Has she had any trauma to her hand(s)? (witness)	Not that I'm aware of.
Has she had any trauma to her abdomen? (witness)	No.
Has she had any trauma to her feet? (witness)	Not that I know of.

Question	Response
When did her abdominal pain start? (witness)	Two days ago, along with the hand and foot symptoms.
What are the events surrounding the start of the pain in her hand(s)? (witness)	I really don't know. I do know she had a little fever last week, up to 101.5, but by the next morning she was back to normal. Then this.
Is there a pattern to her abdominal pain? (witness)	Not that I can tell.
Does the pain in her abdomen come and go? (witness)	No. Not since it started.
Has she had swelling like this before? (witness)	She had a few really mild episodes in the past, but they resolved quickly. Nothing like it is now.
Has she had the pain in her hand(s) before? (witness)	Yes, but much milder. She was much smaller then and couldn't talk as well, but her hands were slightly swollen and she wouldn't hold things. This got better pretty rapidly on its own so I did not take her to be seen.
Does anything make the pain in her feet better or worse? (witness)	Movement or touching her feet makes the pain worse. Ibuprofen, fluids, and rest seem to relieve her pain somewhat.
Does anything make the pain in her abdomen better or worse? (witness)	She seems to get some relief with ibuprofen.
Has there been a change in her urination frequency? (witness)	Yes, she is peeing less often now but she is also not eating or drinking as much.
How severe (1-10 scale) is the pain in her feet? (witness)	She won't stand and even cries when I put her socks on.

Question	Response
Is she taking any prescription medications? (witness)	No.
Has she ever been hospitalized? (witness)	No.
Can you tell me about any current or past medical problems she has had? (witness)	Nothing I am aware of, but I can only go on what I've seen since the time I adopted her.
Is she taking any over-the-counter or herbal medications? (witness)	I just give her ibuprofen now and then when she's sick or in pain.
Are her immunizations up to date? (witness)	Of course! And she has had all the usual well-baby and toddler checks since the time of her adoption.
Does she have any allergies? (witness)	None that I know of.
Are there any diseases that run in her family? (witness)	I adopted her from Haiti when she was a baby. I have no birth records or family history for her. I have no way of finding out about her birth family.

How can I help you today?

Her hands and feet are all swollen and I believe very painful. Both started at the same time. It's gotten progressively worse over the last two days. She doesn't want me to touch her hands. She won't pick anything up anymore, and she refuses to hold anything in her hands.

Does she have any allergies?

Not that I know of

Does she have joint or bone pain?

I don't know what kind of pain or if it is muscle or what, but her hands and fingers toes are clear and painful for her.

What are the events surrounding the start of the pain in her hands?

I really don't know. I don't know she had a little fever last week, up to 101.5 but by the next morning she was back to normal. Then this

How severe (1-10 scale) is the pain in her hands?

She won't hold things..

Has she had the pain in her hands before?

Yes, but much milder. She was much smaller than and couldn't talk as well, but her hands were slightly swollen and she wouldn't hold things. This got better pretty rapidly on its own so I did not take her to be seen.

Any problem moving her hand(s)?

Yes. I can tell it hurts her to move her hands.

Has she had any trauma to her hands?

Not that I'm aware of

Does she have pain/discomfort when she is at rest?

Yes, hands and feet hurt all the time

How severe (1-10 scale) is the pain in her feet?

She won't stand up and even cries when I put her socks on.

Has she had any trauma to her feet?

Not that I know of

Does anything make her pain better or worse?

Movement or touching her feet makes the pain worse. Ibuprofen, fluids and rest seem to relieve her pain somewhat.

Has she noticed that her hands and feet are cold? *No*

When did her swelling start? *2 days ago*

Has she had swelling like this before?

She had a few really mild episodes in the past, but they resolve quickly. Nothing like it is now.

How long does her swelling last?

Constant since it started

Is there any pattern to when her swelling occurs?

They seem to follow colds

Does anything make her swelling problem better or worse?

She Improves with rest, fluids, Motrin, and time

What treatment has she had for her swallowing problems?

Ibuprofen, rest and fluids.

When did you last take her medication?

The ibuprofen? I give it to her when she has pain or fever as needed

How severe are her walking problems?

Severe. She cries when I try to get her to bear weight. She wants to be carried all the time.

Has she had walking problems like this before?

Well, the last time she had an episode like this she wasn't walking yet, but she didn't want me to hold her in the

Does anyone in her family have similar problems walking?

I don't know I adopted her from Haiti

Has anyone else she knows to help the symptoms? *No*

Does she have a problem with fatigue/tiredness?

Yes, if she's not fussy and irritable she is asleep

When did her fatigue / tiredness start?

A week ago. I expected her to feel better after the cold resolved, but she' still fatigued along with the hand and foot symptoms

Does she have generalized weakness? *No*

Does she become more weak or tired with exertion?

She really hasn't been very active

Does he have any difficulty breathing? *No*

Does she become short of breath with exertion? *No*

Does she have any pain in her abdomen?

Yes, I think she does. She indicates that her tummy hurts, and it doesn't look a little swollen to me. She doesn't want me to touch it.

When did her abdominal pain start?

Two days ago, along with the hand and foot symptoms

How long does a pain in her abdomen last?

I think it's pretty continuous since it started

Does the pain in her abdomen come and go?

No. Not since it started.

Is there a pattern to her abdominal pain?

Not that I've noticed. I don't think so.

Does anything make the pain in her abdomen better or worse?

She seems to get some relief with ibuprofen

Has she had any trauma to her abdomen? *No*

Has she had black tar like or how smelling stools? *No*

Does she have diarrhea? *No*

Does she have nausea and/or vomiting?

No, appetite is off but hasn't thrown up

Has she lost any weight recently? *No*

Can you tell me about her diet? What does she normally eat?

Seems normal to me

When did she last eat?

This morning a light breakfast.

Does she have problems urinating? *No*

Has he ever been hospitalized for symptoms like the one she has now? *Nope*

Does your child go to daycare?

She goes to daycare

Has she had any recent acute or chronic infections?

She had a cold

Does she have a cough?

No, she hasn't had any cough or breathing symptoms in the last few days. Only minor cold symptoms last week

Has she had a fever

She had a fever up to five days ago

Is there any pattern to her fever?

When she has a bug, she's usually tired and irritable for 3 to 4 days, and then start to feel better and be more active and playful after the fifth day

Does her fever come and go?

It was consistently high when she had a cold a week ago

What treatment has she had for her fever?

Just some ibuprofen. In the past I didn't bring her to the doctor because it just seem like a cold.

Does she have a rash? *No*

Has there been changes in urinary frequency?

Yes, she is peeing less often she is also not eating or drinking as much

Is she having any trouble with her vision? *No*

Has she recently traveled? Where did she go? *No*

Has she had chickenpox, measles or rheumatic fever? *No*

Are there any diseases that run in her family?

I adopted her from Haiti when she was a baby. I have no birth records or family history for her. I have no way of finding out about her birth family.

Is there a family history of sickle cell disease?

She's a doctor from Haiti. I don't know anything about her birth mother or family. I wish I did

Does she have a history of chronic hemolytic anemia such as sickle cell disease?

I don't know, but I've wondered if that might be something to consider.

Does she have thalassemia? *No*

Are her immunizations up-to-date?

Of course! And she has had all the usual well baby and Tyler Texas a timer for adoption.

What childhood illnesses has she had?

Usual coughs, colds, and tummy aches

Has she ever been hospitalized? *No*

How is her overall health?

She gets colds now and then from exposure at daycare

Diagnosed with autoimmune disease? *I don't know*

Does she have any problems with fatigue, difficulty sleeping, unintentional Weight loss, fevers or night sweats?

She's crying a lot, even after I put her to bed. She doesn't have a fever now that I'm aware of

Does she experienced chest pain discomfort or pressure, pain/Pressure/dizziness with exertion or getting angry, palpitations decrease exercise tolerance or blue coat fingers and toes? *No*

Can you tell me about any current or past medical problems she has had?

Nothing I am aware of, but I can only go on what I've seen since the time I adopted her.

Does she have a history of endocrine disorders? *No*

Has she had any recent blood or lab test? What were the results? *No*

The previous medical, surgical or dental procedures? *Nope*

Is she taking any prescribe medication *Nope*

Is she taking any medication for her symptoms *No*

Is she taking any over-the-counter or herbal medications?

I just give her ibuprofen now and then when she's sick or in pain.

Is she taking aspirin or NSAIDs? How much and how often?

Is ibuprofen that? I gave her just what it says on the bottle and she has a fever or pain

Any other symptoms or concerns we should discuss?

She's not eating well. Not playing. She's very quiet. And oh yeah, she says that her tummy hurts, and it does look like it's swollen to me. She doesn't want me to touch her either

HPI

- 21-month-old
- Afro-American
- Female
- Presenting with her adoptive mother
- Complaints
 - Worsening s/s x 2 days
 - Pain & swelling hands feet x 2 days
 - Abdominal pain and swelling x 2 days
 - Nighttime fussiness x 2 days
 - Difficulty sleeping/ pain x 2 days
 - Fatigue, not playing like usual x 2 days
 - Decreased urinary output x 2 days
 - Decreased appetite “not eating or drinking well” x 2 days
 - Does not want to be touched
 - Refusing to pick up or hold anything.
 - Not bearing weight or walking x 2 days
 - Mother treated with ibuprofen, fluids, and rest, (helped).
 - Had URI 1 week ago
 - Had 101.5 fever 1 week ago.
- Risk Factors
 - Recent URI/ fever 1 week ago.
 - No known exposures
 - Adopted from Haiti
 - Previous similar untreated, self-limiting symptoms.
 - Current with vaccines, well child visits.
- Family History
 - Unknown adopted

Physical Exam Required

Exams 1. Cognitive status

- Verbal. 2.

Blood pressure

- Pulse pressure normal

3. Pulse

- **Regular rhythm**

4. Respiration

5. Temperature

6. Inspect eyes

- **Scleral icterus**, suggesting a total bilirubin of greater than 4 mg/dL, is associated with liver dysfunction and hemolytic anemia.

7. Palpate neck

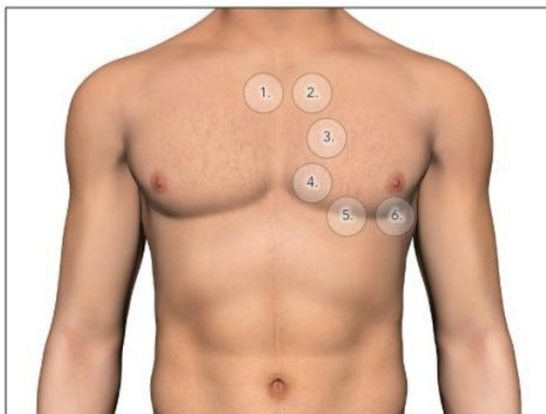
This exam is to look for lymph node enlargement suggestive of an infectious process and the thyroid gland size.

8. Auscultate heart

- **Murmur** - early systolic.

FOLLOW THIS ORDER for Heart and Lungs!!

Auscultate abdominal/femoral arteries for at least **15 seconds** at each area!



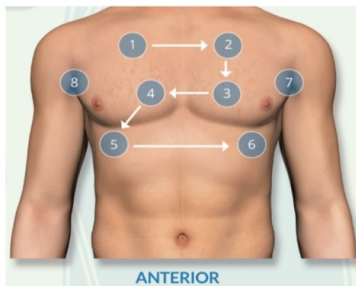
1. Aortic
2. Pulmonic
3. Erb's point
4. Tricuspid
5. Mitral/apex
6. Mitral - midaxillary

ANTERIOR VIEW

Auscultating the Lungs

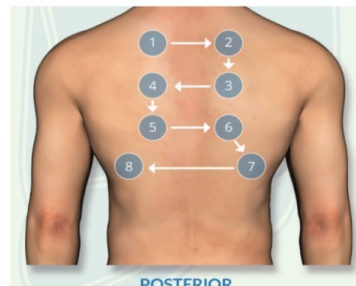
Listen to each location for one complete cycle (inspiration/exhalation).

Pattern matters! Make sure you follow the **correct pattern** of advancement.



Anterior location pattern

1. R Apex
2. L Apex
3. L Superior Lobe
4. R Middle Lobe
5. R Inferior Lobe
6. L Inferior Lobe
7. L Axillary
8. R Axillary



Posterior location pattern

1. L Apex
2. R Apex
3. R Lower Superior Lobe
4. L Lower Superior Lobe
5. L Inferior Lobe
6. R Inferior Lobe
7. R Base
8. L Base

9. Inspect skin overall

The patient's skin should be examined for signs of the following:

- Trauma
- Dehydration
- Pallor, jaundice
- Rash or lesions
- Ulcerations or signs of necrosis

10. Visual inspection abdomen

The abdominal exam consists of inspection, auscultation, percussion and palpation. When approaching a patient, we start with the least invasive first, i.e. inspection. One is looking for signs of enlargement either from gas or masses, or possible scars suggestive of previous surgery

- Distended abdomen

11. Auscultate abdomen

- auscultate abdominal/femoral arteries
- auscultate carotid arteries
- examine pupils

12. Palpate abdomen

When you do the dog can suggest any of the following:

- Infection
- Leukemia
- Sickle cell anemia
- Inborn error of metabolism

13. Reflexes - deep tendon

In any patient with a suspected systemic illness, evaluation of the neurologic system is essential to provide a baseline for change.

14. Palpate extremities

Foot/toe and hand/finger pain with swelling is associated with the following conditions:

- Sickle cell anemia
- Leukemia
- Arthritis
- Tuberculosis
- Dermatomyositis
- Osteomyelitis
- Nephrotic syndrome

15. Assess gait & stance

Refusal to walk is always a critical finding in children. It may suggest the following

- Bone pain (including SCD-related)
- Arthritis
- Leukemia
- Infection
- Heart failure (edema)

16. Test range of motion

Foot and toe pain with swelling is associated with the following conditions:

- Sickle cell anemia
- Leukemia
- Arthritis
- Tuberculosis
- Dermatomyositis
- Osteomyelitis
- Nephrotic syndrome

17. Visual inspection extremities

- Foot swelling is associated with sickle cell anemia, leukemia, heart failure, kidney failure and some infections.
- **Dactylitis** is associated with sickle cell anemia, leukemia, and some infections.

Not Required, Not Inappropriate

- height
- SpO₂,
- weight

Extraneous

- inspect neck
- palpate all lymph nodes
- inspect/palpate head
- measure VP (jugular venous pressure)
- look up nostrils
- inspect ears
- inspect mouth/pharynx
- look in ears with otoscope
- inspect nails
- test capillary refill - fingers
- test capillary refill - toes
- palpate for PM (Point of Maximal Impact)
- dynamic auscultation
- palpate anterior & posterior chest
- percuss anterior & posterior chest
- visual inspection - anterior & posterior chest
- measure girth
- percuss abdomen
- inspect for muscle bulk and tone

Case Findings

Key Finding	MSAP Relation
Acute, severe, persistent R foot swelling with warmth and L hand/fingers swelling (dactylitis)	MSAP
Abdominal pain and distension	RELATED
Fatigue, decreased playing and eating	RELATED
Recent upper respiratory illness (URI)	RELATED
Relief with NSAID, fluid and rest	RELATED
History of recurrent pattern of similar hand and foot symptoms	RELATED
Yellow sclera (scleral icterus)	RELATED
Enlarged spleen (splenomegaly)	RELATED
Refusal to grasp, bear weight, or walk (antalgic gait)	RELATED
Systolic murmur	RELATED
Unknown family history	UNKNOWN

Feedback

The patient's two-day history of acute-onset, recurrent symptoms of left hand swelling and right foot pain with swelling (dactylitis) is the most significant active problem (MSAP). This is a very specific complaint and it will be very useful in narrowing the differential diagnosis. Other key findings from the history and physical exam, here listed as problems, can be provisionally categorized in terms of their relationship to the MSAP:

Associated (related) symptoms:

- Fatigue
- Decreased appetite
- Abdominal pain and distension
- Decreased play
- Refusal to grasp, bear weight, or walk (antalgic gait)
- Relief with NSAIDs, fluid, and rest
- Preceding URI

Associated (related) physical findings:

- Scleral icterus
- Splenomegaly
- Systolic (flow) murmur

Risk factors:

- History of recurrent pattern of similar hand and foot symptoms
- Potential predisposing factors (no family or birth history available)

Many of these findings are nonspecific:

- The possible triggering event of an URI one week prior to presentation is helpful, yet nonspecific, information. Many childhood illnesses are triggered or exacerbated by recent URIs or other viral illnesses
- Fatigue, decreased play, and decreased eating are nonspecific and very common in children with any illness.
- Scleral icterus is a vital finding, but not very specific. Jaundice can be caused by liver disease, hemolysis, infection, and other processes including genetic in-born errors.
- Splenomegaly, similarly, is a very important finding with a very wide differential diagnosis: malignancy, infection, liver disease, blood clots, hemolysis, and in-born genetic diseases.
- An early systolic murmur, or flow murmur, is a common and usually benign finding in cardiac terms, but it can be seen in diverse significant conditions: dehydration, anemia, fevers, infection, pain, anxiety, and tachycardia. Therefore, it is a very nonspecific finding and its diagnostic contribution is low.
- Relief with NSAIDs, fluids, and rest may be helpful, yet nonspecific, information.

Absent family history is not uncommon. The task is to first consider where the child is from geographically and then to consider potential, region-specific exposure. In terms of infectious diseases, worms, malaria, and tuberculosis are good examples. If you know the child's race and ethnicity, you can use that information. as well.

Problem Statement

Your problem statement should have the following:

- Demographics, Age, who they came with
- Complaint
- Symptoms
- Exam findings and **NOTHING ELSE!!**
- **NO** history or risk factors (They go in the **HPI**)

Problem Statement

(This is right from iHuman feedback)

The patient is a 21-month-old girl who presents with a two-day history of progressive, painful, swelling in the left hand and in the right foot with dactylitis, occurring one week after a URI. She now refuses to bear weight or use her hands. Physical exam is also significant for scleral icterus, splenomegaly, and a flow murmur. She has had similar but milder, self-resolving episodes in the past for which she was not seen by a doctor. As the patient is an adoptee from Haiti, no family or birth history is available.

Differentials

Anemia, sickle cell

Extraneous

Leukemia

Arthritis, septic
Arthritis, reactive
Arthritis, psoriatic
Rheumatoid arthritis juvenile

Differentials Ranking

Anemia, sickle cell ----- **LEAD** ----- **MNM**
Arthritis, septic-----Alternate--- **MNM**
Arthritis, reactive-----Alternate
Arthritis, psoriatic-----Alternate
Rheumatoid arthritis juvenile---Alternate

Feedback

Sickle cell anemia is the leading hypothesis for explaining the patient's presentation. Anemia is suggested by fatigue, pallor, and the presence of a flow murmur. Along with presumed hemolysis, as suggested by persistent jaundice, this constellation of signs and symptom is indicative of a chronic hemolytic anemia such as sickle cell anemia, hereditary spherocytosis, hereditary elliptocytosis, G6PD deficiency, beta or alpha thalassemia, and many other less common diseases. Splenomegaly is a common feature in many hematologic conditions, especially chronic hemolytic anemia. A genetic disorder is suggested by the onset of disease at a young age and recurrences of a similar pattern of symptoms. A positive family history is helpful when present.

Septic arthritis, is a reasonable alternative hypothesis for this case. However, her lack of fevers goes against this as a leading hypothesis but the severity of consequences if missed makes it a must-not- miss diagnosis.

The musculoskeletal system does, however, seem to be the source of the edema because the edema is localized to the hands and feet and not generalized as one might see secondary to renal failure, heart failure, lymphatic obstruction or lymphatic disease, adrenal or pituitary problems, liver failure, or protein malabsorption/loss. Therefore, reactive arthritis following an infection is a reasonable alternative diagnosis.

Rheumatic disorders in children may be associated with multiple affected joints, splenomegaly, anemia, and fevers. This is an alternative hypothesis that must be ruled out. A primary bone disorder such as osteogenesis imperfect or an acquired bone disorder such as rickets usually presents with pain (fractures) of large bones after trauma. This is much less likely in this case, and therefore is not on the differential list.

There are no clear neurologic signs or symptoms: The patient's refusal to walk or use her extremities does not appear to be associated with weakness or incoordination; rather, it appears to be associated with musculoskeletal pain. Bone pain (refusal to walk) is classic for sickle cell anemia, leukemia, osteomyelitis, and arthritis.

Leukemia, a white blood cell disorder, can present with dactylitis and is classically associated with splenomegaly, anemia, limping, fevers, and (occasionally) jaundice. However, leukemia (like most cancers) is progressive, not intermittent, and does not have recurring intermittent symptoms over many months, therefore it also is not on the differential diagnosis list.

Lab Tests (YES, ALL of these)

1. Antinuclear antibody (ANA), blood

2. Blood culture and sensitivity
3. C-reactive protein (CRP), blood
4. Complete blood count (CBC), blood
5. Erythrocyte sedimentation rate (ESR), blood
6. Hemoglobin electrophoresis, blood
7. Lactate dehydrogenase (LDH), blood
8. Left foot x-ray
9. Left hand x-ray
10. Liver function tests (LFTs): ALT, albumin, ALP, AST, GGT, bilirubin (direct and indirect)
11. Peripheral blood smear, blood
12. Rapid plasma reagin (RPR), blood
13. Reticulocyte count, blood
14. Right foot x-ray
15. Right hand x-ray
16. Tuberculin skin test

DO IT EXACTLY LIKE THIS

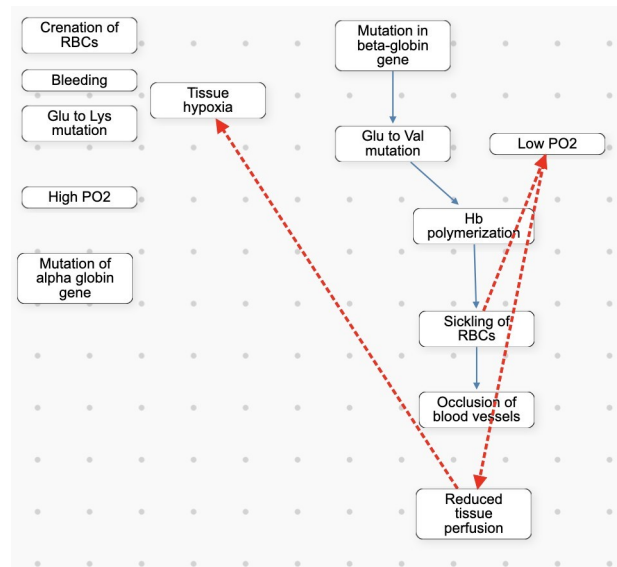
Question

Draw a concept diagram illustrating the mechanism of action by which a sickle cell crisis occurs. You will need to use eight (8) of the boxes and make seven (7) connections. You must use "Low PO₂." If you make more than 7 connections your score will be 0.

General Instructions

Create a diagram to show the causal relationships among the concepts shown in the boxes. Your goal is to connect the concepts in a way that shows which concepts influence or cause other concepts.

1. You should start by spreading out the boxes, placing those that influence others higher up on the diagram.
 - a. If you use a mouse or trackpad, drag the boxes to empty areas on the drawing area.
 - b. If you use a touch screen, tap on a box, then tap on an empty location on the drawing area to move the box.
2. Connect a pair of boxes with an arrow by first clicking on one box (the cause/influencer) and then on another box (the consequence) to create an arrow from the first to the second.
3. Re-arrange boxes as needed to make the diagram readable.
4. Some diagrams have plus or minus on the arrows. The (+) means that one concept positively influences the other. The (-) means that one concept negatively influences the other. Change the sign by selecting it (one click) and then clicking it again to change it.
5. You can delete an arrow by selecting it (one click) and clicking "Remove Connection" at the bottom of the drawing window.



Question 2 of 3

The parents of a newborn child are known to have sickle cell trait; i.e., they are both heterozygous (AS). What is the chance that the newborn is homozygous (SS)?

- 100%
- 75%
- 50%
- 25%**
- 0%

Discussion

- Since both parents are AS, the chance of their gametes (ova and sperm) having the gene for HbS is 0.5 (1/2).

- Since an egg is randomly fertilized by a sperm, the chance that the resulting zygote will be SS is $0.5 \times 0.5 = 0.25$ (1/4).

Question 3 of 3

The newborn child has two siblings: One who is known to be SS (homozygous) and the other is known to be AS (heterozygous). What is the likelihood of the newborn being SS?

- Increased
- Decreased
- **No change**

Discussion

The likelihood of the newborn being SS is determined ONLY by the probability of it being SS which is determined by the distribution of sperm and eggs with the gene for S. This probability is independent of the genotype of other siblings. This situation is the equivalent of flipping coins. Knowing that the previous flip of the coin came up heads does not change the probability of the next coin flip yielding a heads.

What is the correct diagnosis for this patient?

Sickle cell anemia

Diagnosis Feedback

The patient has sickle cell disease presenting with dactylitis, splenomegaly, and anemia. The most common early manifestations of sickle cell disease include the following:

- Anemia
- Dactylitis
- Other nonspecific painful events; i.e., vaso-occlusive episodes
- Splenomegaly; often leading to splenic sequestration
- Acute chest syndrome
- Stroke
- Aplastic crisis

Plan: