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A Diagnostic Dilemma: QIPS

Ryan Carlisle
Providence

Paulina Giacomelli
Providence

Kyler Wyer
Providence

Julia Nyiro
Providence

Nolan Weinstein
Providence

See next page for additional authors

Authors

Ryan Carlisle, Paulina Giacomelli, Kyler Wyer, Julia Nyiro, Nolan Weinstein, and Judy Swanson (Faculty Advisor)

A Diagnostic Dilemma: QIPS

- Ryan Carlisle, MD
- Paulina Giacomelli, MD
- Kyler Wyer, DO
- Julia Nyiro, MD
- Nolan Weinstein, MD

Faculty Advisor: Judy Swanson, MD

12/20/22: 71-year-old female with history of dementia and multiple recent ED visits for symptomatic UTI is brought to Sacred Heart ED from SNF for altered mental status

Additional history

- Patient hypotensive at SNF (70s/50s), receives 1L IVF in transit
- Personal history difficult to obtain given AMS. Attempts to contact family are without useful information

Objective Data

- Vital signs (per AMS) BP: 91/55 HR: 106 RR: 22 O2: 94% on RA
- The following lab values are obtained and then resulted at 15:32:

Lab	12/20/22 1532
WBC	10.28
HGB	11.8
HCT	39.3
PLT	178

Lab	12/20/22 1532
NA	147*
K	3.6
CL	124*
CO2	<10*
BUN	26*
CREA	0.92
CALCIUM	5.9*
ALT	10
AST	26
ALKPHOS	71
BILITOT	0.3
ALBUMIN	2.2*
LIPASE	65

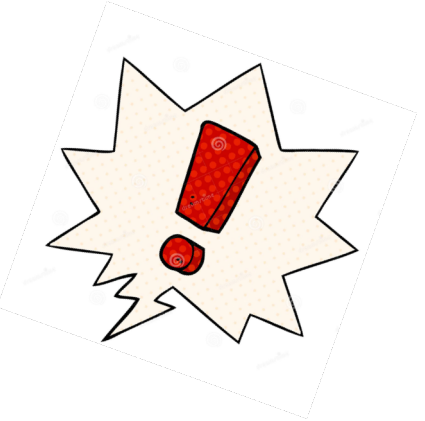
Lab	12/21/22 1018
LACTATE	2.6*

Interim

- An additional 500ml of IVF is documented as “given at 2100”
- q6H labs are redrawn around this time. They result at 22:27 and are as follows:

Lab	12/21/22 0053	12/20/22 1532
WBC	16.30*	10.28
HGB	15.6*	11.8
HCT	52.5*	39.3
PLT	221	178

Lab	12/20/22 2227	12/20/22 1532
NA	127*	147*
K	4.2	3.6
CL	99	124*
CO2	16*	<10*
BUN	29*	26*
CREA	1.33*	0.92
CALCIUM	8.7	5.9*
ALT	--	10
AST	--	26
ALKPHOS	--	71
BILITOT	--	0.3
ALBUMIN	3.7	2.2*
LIPASE	--	65



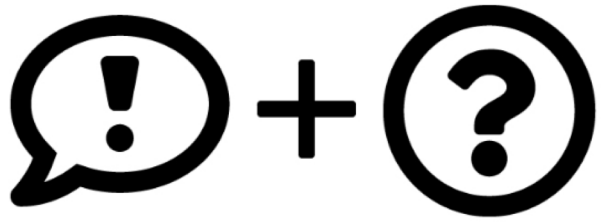
Dilemma

- First hypernatremia, now hyponatremia?
- The patient suddenly has an AKI despite fluids?
- First no leukocytosis, now WBCs are 16K?

Do we trust the first set? The second set? Neither?

Follow up

Lab	12/21/22 0419	12/21/22 0053	12/20/22 1532
WBC	14.14*	16.30*	10.28
HGB	16.2*	15.6*	11.8
HCT	52.2*	52.5*	39.3
PLT	248	221	178



Lab	12/21/22 1959	12/21/22 1454	12/21/22 1101	12/21/22 0419	12/20/22 2227	12/20/22 1532
NA	139	142	141	128*	127*	147*
K	5.3*	5.4*	5.6*	4.2	4.2	3.6
CL	109	111*	109	101	99	124*
CO2	20*	20*	19*	12*	16*	<10*
BUN	56*	54*	51*	27*	29*	26*
CREA	2.17*	2.01*	2.00*	1.34*	1.33*	0.92
CALCIUM	8.4*	8.7	9.0	8.7	8.7	5.9*
ALT	--	--	--	--	--	10
AST	--	--	--	--	--	26
ALKPHOS	--	--	--	--	--	71
BILITOT	--	--	--	--	--	0.3
ALBUMIN	3.2*	--	--	3.7	3.7	2.2*
LIPASE	--	--	--	--	--	65

What happened?

Possibilities:

1. Administration of fluids interfered with lab draw, either:
    1. More IVF was analyzed than blood
    2. There is less severe hemodilution
2. The blood sample hemolyzed
3. The wrong patient's blood was run through the analyzer (clerical error)
4. The analyzer itself was broken
5. Another explanation

We contacted the lab

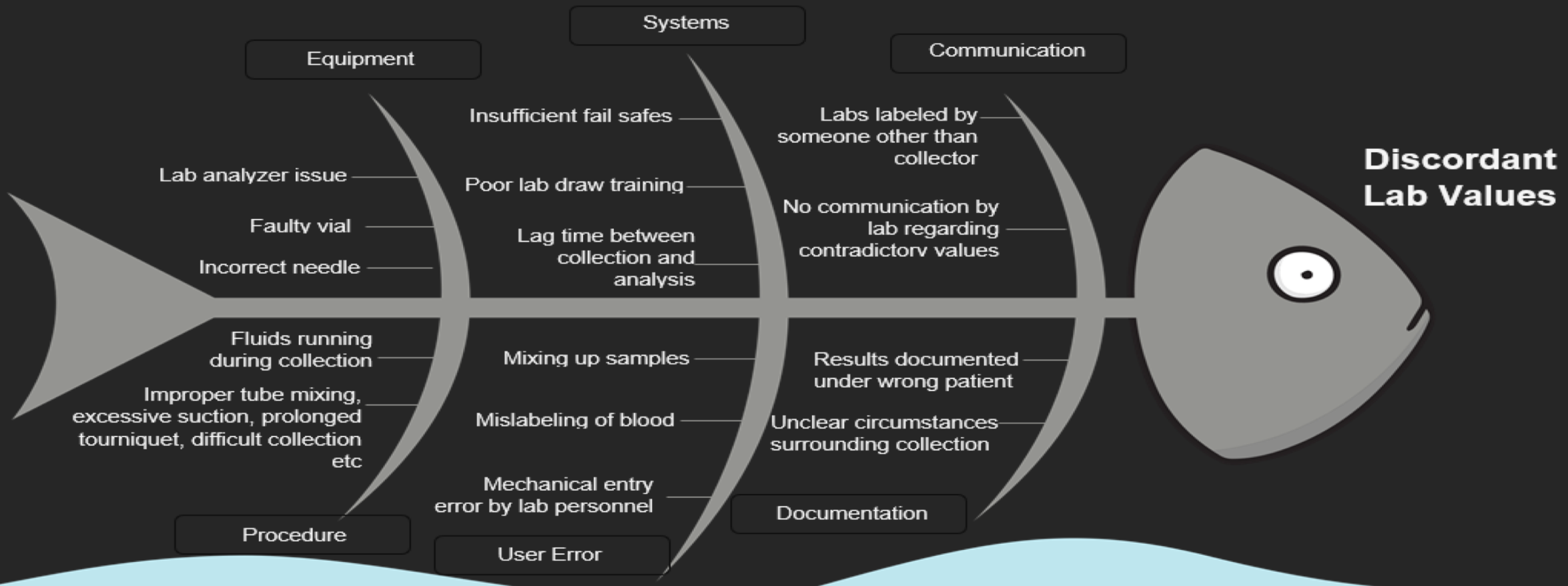
- Response: no data available regarding
  - Which phlebotomist drew the lab
  - Body location of blood draw
  - Type of needle used (straight vs butterfly) or if obtained from peripheral line
  - Time of sample collection
  - Relative integrity of the blood sample

- “Our guess is that fluids were running at the same time as the lab draw”

What makes sense?

- Administration of fluids directly interfered with lab draw?: possible -> documented that fluids running time of 2nd draw
- Hemodilution?: Cell counts went UP!
- Clerical error/wrong patient's blood analyzed?: unlikely, significant redundancy built into our system to avoid errors like this
- Analyzer error: very unlikely, analyzers are closely maintained by laboratory staff and a malfunction or error would have caused a fuss

FISHBONE DIAGRAM



We need better lab tracking

- Though infrequent, lab errors do happen at PSHMC
- Currently no system in place to track/evaluate the root of these errors
- Given importance in clinical decision making, we propose design/implementation of a system that tracks more data related to blood capture, integrity, transport, and analysis

Some ideas for the future

- When phlebotomist scans patient armband, software records time of scan and infers time of draw
- Hand scanning tool allows phlebotomist to specify location of draw and instrument used (straight, butterfly, catheter)
- Hand scanning tool allows phlebotomist to comment on confounding factors (”fluids appear to be running”)
- Hand scanning tool or EMR allows phlebotomist to comment on low vs high risk of sample hemolysis depending on experience with draw

What happened to the patient?

- Fortunately, no adverse events or harm done to patient
- Pt did go to the ICU for unrelated reasons
- Our hope: prevent errors like this by knowing more about what causes them and potentially putting in place measures to prevent them

Thank you!