Cardiac Anesthesia Subcommittee Minutes

Apr 5, 2023

1:00pm – 2:00pm EST

Zoom

	Abernathy, Jake (Johns Hopkins)		Lacca, Tory (MPOG)
	Atwood, Tammy (Henry Ford Allegiance)		Low, Ying (Dartmouth)
	Bailey, Meridith (MPOG)		Malenfant, Tiffany (MPOG)
	Barrios, Nicole (MPOG)		Mathis, Mike (MPOG)
	Brown, Morgan (Boston Childrens)		Muehlschlegel, J. Danny (Brigham & Women's)
	Buehler, Kate (MPOG)		Schonberger, Rob (Yale)
	Coleman, Robert (MPOG)		Shah, Nirav (MPOG)
	Geube, Mariya (Cleveland Clinic)		Shook, Doug (Brigham & Women's)
	Ghaly, Tammer (Yale)		Smiatacz, Frances Guida (MPOG)
	Guruswamy, Jay (Henry Ford Health System)		Sturmer, David (University of Michigan)
	Heiter, Jerri (Trinity - St. Joseph Ann Arbor)		Varelman, Dirk (Brigham & Women's)
	Janda, Allison (MPOG)		Welle, Erin (University of Michigan)
	Katta, Guarav (Henry Ford Health System)		Zittleman, Andrew (MPOG)
	Kumar, Vikram (Massachusetts General Hospital)		

Meeting Summary

1. **Upcoming Cardiac Focused Measure Reviews**
    a. We are seeking one or two volunteers from different institutions, to review this measure and associated colloid use literature
        i. Commitment:
            1. Present literature and suggestions at the July Quality Committee meeting
            2. Reviewers name will be listed on the Measure Spec
        ii. Template form
        iii. Result of the review is to either: keep the measure as-is, revise the measure based on the reviewer assessment of the literature and discussion of the quality committee meeting, or retire the measure completely.
    b. FLUID-01-C: Minimizing Colloid Use (Cardiac) - review in July 2023
        i. Definition: Percentage of cardiac cases in which colloids were not administered intraoperatively
        ii. Rationale: Lack of consistent evidence to suggest improved survival with the use of colloids as compared to crystalloids in the surgical population. Because colloids are

more expensive than crystalloids, it is recommended that anesthesia providers avoid the use of colloids in most instances.

c. TEMP-06-C & TEMP-07-C reviews in January 2025

d. Discussion:

i. *Tammy Atwood (Henry Ford Allegiance)* via chat: In perfusion, it's actually recommended to prime our circuit with albumin to prevent high pressure excursion (coating our Oxygenator)

1. *Allison Janda (Cardiac Subcommittee Chair)*: That's a great point, Tammy. This underscores the importance of reviewing these measures to build these considerations into the measure if they aren't included already.
2. *Dirk Varelmann (BWH):* Our perfusionist don't do this. You would have to measure transmembrane pressure to determine the effect of albumin, which is infrequently done in CPB. I'm curious how frequently albumin is used

2. GLU-06 Discussion and Preliminary Data

a. Cardiac Hyperglycemia Avoidance Measure

i. **Description**: Percentage of patients, ≥18 years age, who undergo open cardiac surgical procedures under general anesthesia of 120 minutes case duration or longer for whom any blood glucose measure did not exceed 180 mg/dL (and not rechecked within 30-minutes and found to be </=180 mg/dL) was documented.

1. Note: open cardiac cases without ANY glucose values documented are flagged

ii. **Timing:** Anesthesia Start to Anesthesia End

iii. **Attribution**: The provider signed in at the first blood glucose of >180mg/dL.

1. In the event that two or more providers in the same role are signed in, both will receive the feedback.

iv. **Inclusions:** All patients, 18 years of age or older, both with and without diabetes, who undergo open cardiac surgical procedures (as determined by Procedure Type: Cardiac phenotype) under general anesthesia of 120 minutes duration or longer.

v. **Exclusions:**

1. ASA 6
2. Patients < 18yo
3. Organ harvest (CPT: 01990)
4. Non-cardiac cases as defined as those cases not meeting criteria for the cardiac case type phenotype
5. Within the general cardiac case type phenotype, exclude: Transcatheter/Endovascular, EP/Cath groups and Other Cardiac

vi. **Considerations**

1. Evaluate each high glucose between anesthesia start and end:
    a. Blood glucose >180mg/dL is rechecked within 30 minutes and found to be >180mg/dL = flagged.
    b. Blood glucose >180 mg/dL is not rechecked within 30 minutes = flagged.
    c. Any case with a glucose >180mg/dL that was rechecked within 30 minutes and found to be </=180mg/dL = pass. **purpose of this is to catch any artifacts, not measure whether the hyperglycemia is treated (that would require a number of other features within the measure) - for example, if a blood glucose measure was drawn off of

a line that D5 is running through and is 300, the team realizes this and rechecks off of a different line and the glucose is 130**

2. If no high glucose values > 180 mg/dL are documented between anesthesia start and end = passed.
3. If no blood glucose values are documented for a case = flagged.
4. If two blood glucose levels are documented in the same minute, the lower blood glucose will be considered for this measure

vii. **Limitations:**

1. Any glucose checks not entered into the EHR will not be captured

viii. **Remaining Questions:** Follow-up measure with a caveat for insulin treatment within a specific time window?

ix. **DISCUSSION:**

1. *Guarav Katta (Henry Ford Health System) via chat*: I think you said this earlier Allison, but just to be crystal clear: GLU-06 would thus be *exactly* the same as the STS measure? That is to say, in STS a measure greater than 180 fails even if you are treating it (i.e. an outcome measure, not a process measure).
    a. *Allison Janda (Cardiac Subcommittee Chair)*: Yes - that is correct. This is different from the other ASPIRE glucose measures which consider treatment
2. *J. Danny Muehlschlegel (BWH)*: What about a blood glucose >180, insulin is started, but next check is at 31 minutes and glucose still >180.
    a. *Allison Janda (Cardiac Subcommittee Chair):* That case would be flagged. The intent of the 30 minute window is not to see if people are treating the high glucose but rather to assess if the first value was an artifact value. It is aggressive but aligns with the STS measure. I think there is utility in creating a separate measure that would get into the reason for flagging that case.
    b. *Guarav Katta (Henry Ford Health System)*: I agree with that failing. STS fails us if we have any glucose over 180 and so being "harsh" with this ASPIRE metric makes sense. I think failing at greater than 180 with little recourse makes sense since that's where STS. To align with STS, we should not try and be less "harsh"
    c. *Allison Janda (Cardiac Subcommittee Chair):* Overall idea is to keep as consistent with STS standards. Any glucose > 180 will be flagged.
3. *Mariya Geube (Cleveland Clinic) via chat*: Centers with higher case volume, seems to have a lower adherence...centers have different insulin protocols, and different protocols for glucose monitoring (30 min vs 1 hour)
4. *Nirav Shah (MPOG Quality Director)*: If there's a down-trending glucose there is risk of overcorrecting as well. Those would potentially be outliers however, when you have brittle diabetics it may be difficult to correct the glucose in that amount of time.
    a. *Allison Janda (Cardiac Subcommittee Chair):* For this measure we wanted to acknowledge/flag the cases that had a glucose over 180. I think there are multiple ways this measure can be modified to create a separate measure that would either flag hypoglycemia or a different measure that would include treatment thresholds. The

intent of this specific measure isn't treatment but more of the incidence of hyperglycemia.

5. *Rob Schonberger (Yale):* Share some of Danny's implied skepticism. STS aims for tight blood glucose control but can we get clarification about the recommendations as I don't see a hard and fast rule to keep blood sugar </=180 or the case fails? It seems like there are some caveats built into the guidelines that aren't accounted for in this measure.
    a. *Alison Janda (Cardiac Subcommittee Chair)*: Although their written guidelines state to avoid blood glucoses over 180, the STS measures are binary (they fail cases for blood glucoses of >180), so to keep things consistent with their metrics would be to keep glucose below 180 for our measure in line with recommendations from STS.
    b. *Guarav Katta (Henry Ford Health System)* - If you look at the STS recommendations it's not obvious that they treat it as a yes/no for above 180, however that's different than the STS dashboard. From a practice standpoint, we are flagged for any glucose over 180 for whatever reason. Since we are failed anyway, we should align with STS. I think the threshold for the STS measure is 75%. Are we thinking of having the same threshold rather than 90%?
    c. *Allison Janda (Cardiac Subcommittee Chair)*: Normally our process measures are 90% however we can set a different threshold if the subcommittee agrees.
6. *Mike Mathis (MPOG Research Director)* - Regarding the exact definition of this measure I support aligning with STS however we need to, over time, look into the reason for the elevated glucose. Somehow to diagnose where it's coming from. Is it rapidly downtrending or was it truly a glucose over 180 for 3 hours. As this measure matures we should allow ourselves to pivot but starting with flagging all cases with a lab over 180.
    a. *Kate Buehler (MPOG Clinical Program Manager)* - i think this is a good stepping stone and a good place to start and also having the breakdown of case attribution on the dashboard.
    b. *Allison Janda (Cardiac Subcommittee Chair)* - Agree, the stacked bar graph on the dashboard would be very helpful as well. It would be helpful as a provider to see my incidence of high glucose as well as a subsequent treatment measure in the future. The STS measure is more strict than the guideline - it is a pass/fail measure for any glucose greater than 180 during the case
7. *Gurav Katta (Henry Ford Allegiance)* STS comically doesn't penalize you for hypoglycemia. Whether "right" or "wrong", STS gives you an incentive to aggressively treat hyperglycemia even if it results in hypoglycemia. Again, not saying that's good or bad just that it's the incentive. We would simply be aligning with that.
    a. *Rob Schonberger (Yale) via chat:* Thanks for this! I think you can go ahead and say that's bad IMO. But that's okay. I like the strict measure as long as the local QI champion can be sure to present it in appropriate context including availability of treatment data. there are some sites with low case volumes - is that an error of the phenotype?

    b. *Allison Janda (Cardiac Committee Chair):* Definitely agree about a lack of hypoglycemia measure as well. That's a great question- no those are actual cardiac cases but those sites have recently started submitting to MPOG and have low case volume or just do only a few cases per year

8. *Erin Welle (University of Michigan)*: Is there any way to know what time/what glucose content each place uses? Del nido doesn't have any and Buckberg has variable glucose formulations *plegia type

a. *Allison Janda (Cardiac Subcommittee Chair):* Thank you for this insightful comment, Erin. Yes, the cardioplegia type definitely impacts the timing and degree of hyperglycemia for cardiac cases. For instance at U of M, we use Del Nido and Buckberg, and administration of Buckberg is a high glucose load for the patient, and it is also redosed frequently, both of which make avoiding any blood glucose levels >180 very challenging. Unfortunately, MPOG does not capture the type of cardioplegia administered so we cannot reliably account for this in the MPOG measures we design.

9. *Allison Janda (Cardiac Committee Chair)*: Any other thoughts? Should we plan for a corresponding hypoglycemia and a treatment measure?

a. *Mike Mathis (U.MIchigan)*: agree

b. *Tammer Ghaly (Yale) via chat*: I feel like it would be beneficial to include a follow up treatment measure. Sometimes a baseline sugar in a non-diabetic patient suddenly jumps over 180 when you go on pump

c. *Guarav Katta (Henry Ford Health System)*: Yes. That would be very useful in my opinion Allison. I think we should definitely have a corresponding hypoglycemia measure

d. *Allison Janda (Cardiac Committee Chair)*: Excellent, we will create a countermeasure that would flag cases with hypoglycemia that does not have the same specifications as the current GLU-02 measure which allows for a pass if the hypoglycemia is treated since we want to know if there are any cases with hypoglycemia whether or not they were treated.

10. *Allison Janda (Cardiac Committee Chair)*: Thoughts on the time threshold for a new measure for treatment of hyperglycemia?

a. *J. Danny Muehlschlegel (BWH):* 30 minutes

b. *Allison Janda (Cardiac Committee Chair)*: Agree, I think this would be a good place to start and then compare with 60 minutes and examine if there is a difference in performance.

11. *Morgan Brown (Boston Children's)*: As a primary pediatric site, we don't submit to adult STS, but enter our cases into the congenital STS. So this metric from STS doesn't really apply to us, so to be honest we haven't been as aggressive as it sounds like many of you have been in rechecking or treating hyperglycemia.

a. *Allison Janda (Cardiac Committee Chair)*: Pediatric patients <18 years old are excluded but should we consider adding a measure for pediatric cardiac specific cases.

    b. *Morgan Brown (Boston Children's)*: We perform cases on congenital heart patients >18 years old so they would be included in this measure but we have not been this strict with them either.
    c. *Meridith Bailey (MPOG Pediatric Program Manager) via chat:* Other MPOG glucose measures exclude patients < 12y. Is it worth doing the same for GLU-06-C?
    d. *Morgan Brown (Boston Children's) via chat*: I'd have to think about it - to be honest, in congenital cardiac we do not treat hyperglycemia until much higher than 180 because our patients don't have baseline diabetes like the adults. But I think there is value in seeing our rates of hyperglycemia (in all patients), but I don't know what threshold would be more reasonable - maybe more like 220 but I'd have to poll people at different institutions.
12. *Jake Abernathy (Johns Hopkins*) - Agree. Thanks for your work on this measure.
13. *Michael Mathis (MPOG Research Director)*: I like the idea of a new hypoglycemia measure that matches the approach of cardiac hyperglycemia measure. Have matching measures as STS. Was it untreated or hypoglycemia that was promptly treated?
    a. *Allison Janda (Cardiac Subcommittee Chair)*: Agree! We can then incorporate the other considerations & timeframes of the cardiac measure into the hypoglycemia measure
    b. *Gauarav Katta (Henry Ford Health Systems)*: If we did design a cardiac hypoglycemia measure, any chance STS could adopt it? That is to say, can this alignment work two ways? Or is it just us trying to align with them?
    c. *Allison Janda (Cardiac Subcommittee Chair):* Good idea. Can take this to them and see if we can align with them. Definitely not just us always aligning with them, this can be a bidirectional collaboration.
14. *Tammer Gahy (Yale)* - 60 mg/dl seems like a very low number to me as a treatment threshold for hypoglycemia. Should we use a higher minimum threshold for the hypoglycemia measure? Also, should initiation of insulin infusion be considered as treatment for the hyperglycemia measure?
    a. *Gurav Katta (Henry Ford Allegiance)* - General thought was <70 mg/dl but I'm not sure what the threshold is in the literature but my gut says 70
    b. *Mariya Geube (Cleveland Clinic)* - Threshold is < 60 so I don't think we need to change that. Addressing when to start the insulin gtt is a totally different issue.
    c. *Jake Abernathy (Johns Hopkins)* - Hopkins uses 70 as the definition of hypoglycemia
    d. *Mariya Geube (Cleveland Clinic*): Just checked, according to American Diabetes Association and Centers of Disease Control, both state hypoglycemia is defined as glucose < 70 mg/dL. Thank you for the correction Dr. Abernathy.
    e. *Allison Janda (Cardiac Subcommittee Chair)*: We will communicate more via Basecamp about threshold for low blood glucose & the definitions for these new measures.

15. *Rob Schonberger (Yale)*: Does anyone think we should perhaps feel obligated to watch and see if hypoglycemia metric increases perhaps 3-6 months after this rollout within MPOG centers?
    a. *Mariya Geube (Cleveland Clinic)*: Yes this is a valid concern
    b. *Allison Janda (Cardiac Subcommittee Chair)*: Great point. Either way we can investigate that data even if its not on the dashboard for sites just yet.

3. **Hypoglycemia Avoidance Counter Measure**
    a. Purpose: To ensure this measure is not inducing an increase in hypoglycemia
    b. Options: Also present GLU-02 on the cardiac dashboard
        i. GLU-02: % of cases with intraoperative glucose < 60 with administration of dextrose containing solution or glucose recheck within 90 minutes of original glucose measurement
4. **Develop a new measure to remove the treatment component and just flag cases with hypoglycemia**
5. **Develop another new hyperglycemia avoidance measure that incorporates treatment of hyperglycemia.**
6. **Progress and Next Steps**
    a. Build 1 cardiac-specific measure in 2021 (completed, published 12/2021)
    b. Post-bypass hypothermia avoidance
    c. Build 1 cardiac-specific measure in early 2022 (completed, published 11/2022)
    d. On-bypass hyperthermia avoidance
    e. Plan and build next measure in mid-2022 and publish in early 2023 (nearly done!)
    f. Glucose management
    g. Next measure? Previous suggested topics include:
        i. Antibiotic selection and timing
        ii. Neuromuscular blockade reversal
        iii. Pulmonary complication avoidance
        iv. Hypotension avoidance
        v. Acute kidney injury avoidance
        vi. Handoffs
        vii. Transfusion
        viii. Other ideas?
    h. DISCUSSION:
        i. *Allison Janda (Cardiac Subcommittee Chair):* Given that we are going to be building 2 additional glycemic management measures between now and the next meeting, do we want to tackle any of these additional measure topics or hold off and discuss after those glycemic management measures are released?
            1. *Guarav Katta (Henry Ford Health System)*: I like the timing for what you mentioned for the prior metrics Allison.
            2. *Gurav Katta (Henry Ford Health System):* For future metrics, I worry about AKI since it's so multifaceted. That's the only one I worry about
            3. *Tammer Ghaly (Yale)*: I feel that NMB reversal is something we should look at
            4. *Gaurav Katta (Henry Ford Health System)*: The benefit of AKI as a metric is that it's a very difficult one to affect. Which means lots of opportunities for research and data collection/mining

5. *Allison Janda (Cardiac Committee Chair)*: Definitely agree that we may not know enough currently about how to reliably avoid AKI and therefore it may not be a great next measure, but a potential future measure topic once more information is known. We can table the selection of the next measure until the next meeting in August) and work on the other two glucose measures we discussed in the meantime.

7. **Cardiac Anesthesia Subcommittee Membership**
    a. Next meetings:
        i. April 2023
        ii. August 2023
        iii. Nov/Dec 2023
    b. Open to all anesthesiologists or those interested in improving cardiothoracic measures
        i. Do not have to practice at an active MPOG institution to participate
    c. Thank you for continued use of the Basecamp forum for discussion between meetings!

Meeting adjourned at 1:59pm EST