ASPIRE Obstetric Anesthesia Subcommittee Meeting

December 7, 2022

Agenda

- Announcements
- July 2022 Meeting recap
- TEMP 01: Fluid warmers acceptable active warming device?
- Preliminary GA-03-OB Data Review
- Oxytocin Dosing for Cesarean Delivery
- Duke Research Study: Placenta Accrete

Announcements

OB Subcommittee Meetings:

- February 15, 2023 1pm EST
- May 24, 2023 1pm EST
- November 15, 2023 1pm EST

July Meeting Recap

- Presented data capture rates for cesarean delivery cases in MPOG
  - ~70% of cases have medications documented within 0-1 hour before scheduled cesarean delivery
  - ~40% of cases have medications documented within 1 hour before conversion cases (L&D data is not always included in the MPOG data submission)

- Subcommittee voted to move forward with GA-03-OB:
  - % of cesarean delivery cases converted to GA from an epidural
  - Measure spec drafted and posted to Basecamp for feedback

TEMP 01: Active Warming

MPOG

Background

- TEMP 01-published in January 2020
- Every 3 years, each ASPIRE measure is reviewed by the Quality Committee
- Last reviewed at the July Quality Committee meeting and decision was made to defer to the OB subcommittee: Should TEMP 01 continue to accept fluid warming as active warming for this patient population?
- Additional discussion from QC: Place temp sensing foley to get accurate core temp in cesarean patients (instead of skin temperature)

TEMP 01 Considerations for Cesarean Delivery Cases

Description:

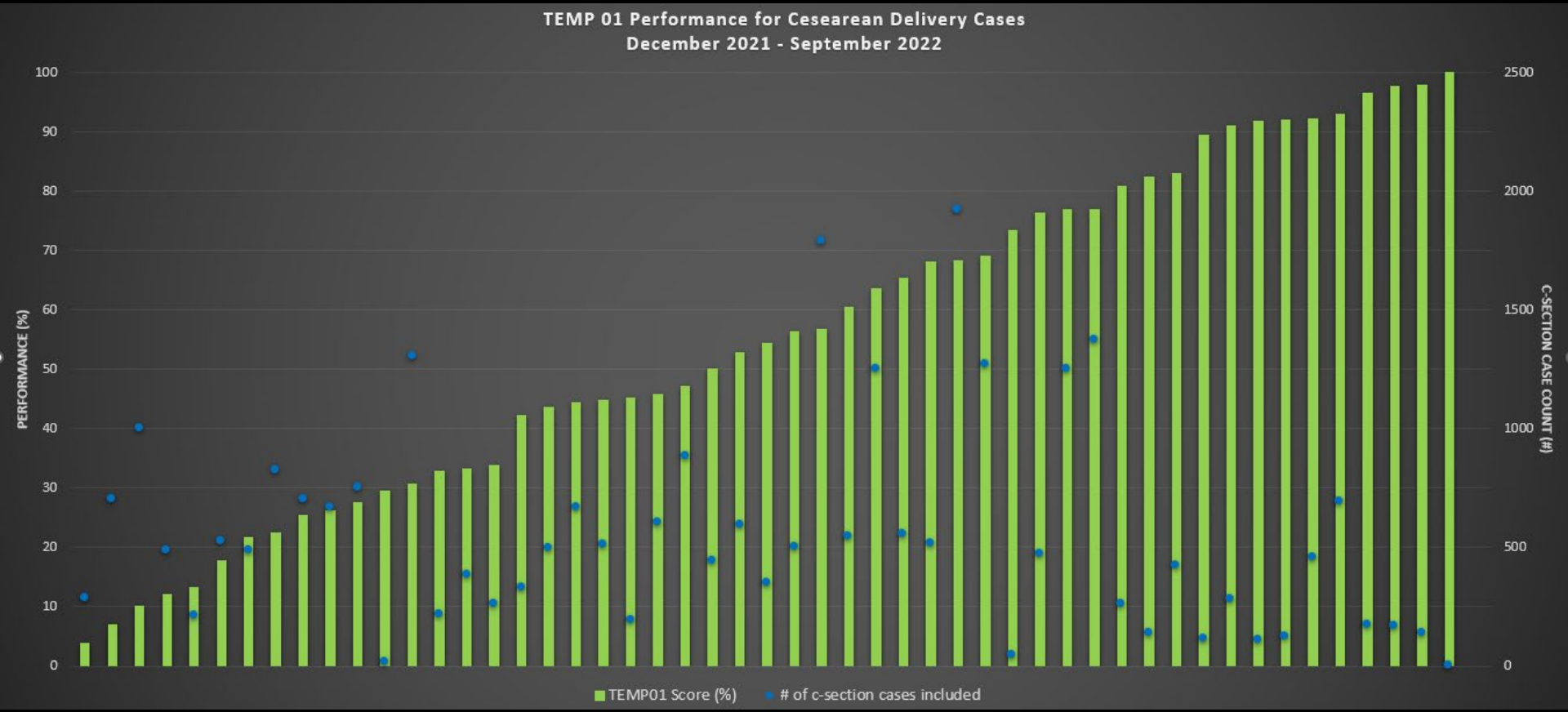
Percentage of cases in which an active warming device was applied intraoperatively, or the patient maintained a temperature above 36.0°C without active warming.

Active warming defined as:

- Convective warming
- Conductive warming
- Endovascular warming
- Radiant heaters
- For cesarean delivery cases only: Fluid warmers

Exclusions:

– Labor epidurals & cases less than 60 minutes case duration


TEMP 01 Performance for Cesearean Delivery Cases
December 2021 - September 2022
PERFORMANCE (%)
C-SECTION CASE COUNT (#)
100
90
80
70
60
50
40
30
20
10
0
2500
2000
1500
1000
500
0
TEMP01 Score (%)
# of c-section cases included

Warming Literature

Obstetric Active Warming Literature: Forced Air Warming vs. No Warming

Obstetric Anesthesiology
Section Editor: Cynthia A. Wong

Intraoperative Forced Air-Warming During Cesarean Delivery Under Spinal Anesthesia Does Not Prevent Maternal Hypothermia

Alexander J. Butwick, MBBS, FRCA

Steven S. Lipman, MD

Brendan Carvalho, MBBCh, FRCA

BACKGROUND: Prewarming and intraoperative warming with forced air-warming systems prevent perioperative hypothermia and shivering in patients undergoing elective cesarean delivery with epidural anesthesia. We tested the hypothesis that intraoperative lower body forced air-warming prevents hypothermia in patients undergoing elective cesarean delivery with spinal anesthesia.

METHODS: Thirty healthy patients undergoing cesarean delivery with spinal anesthesia were randomly assigned to forced air-warming or control groups (identical cover applied with forced air-warming unit switched off). A blinded investigator assessed oral temperature, shivering, and thermal comfort scores at 15-min intervals until discharge from the postanesthetic care unit. Umbilical cord blood gases and Apgar scores were also measured after delivery.

RESULTS: The maximum core temperature changes were similar in the two groups (−1.3°C ± 0.4°C vs −1.3°C ± 0.3°C for the forced air-warming group and control group, respectively; $P = 0.8$). Core hypothermia (≤35.5°C) occurred in 8 of 15 patients receiving forced air-warming and in 10 of 15 unwarmed patients ($P = 0.5$). The incidence and severity of shivering did not significantly differ between groups. Umbilical cord blood gases and Apgar scores were similar in both groups (P = NS).

CONCLUSIONS: We conclude that intraoperative lower body forced air-warming does not prevent intraoperative hypothermia or shivering in women undergoing elective cesarean delivery with spinal anesthesia.

(Anesth Analg 2007;105:1413-9)

- N=30 elective cesarean patients
- No significant difference between study groups (FAW vs. no active warming)

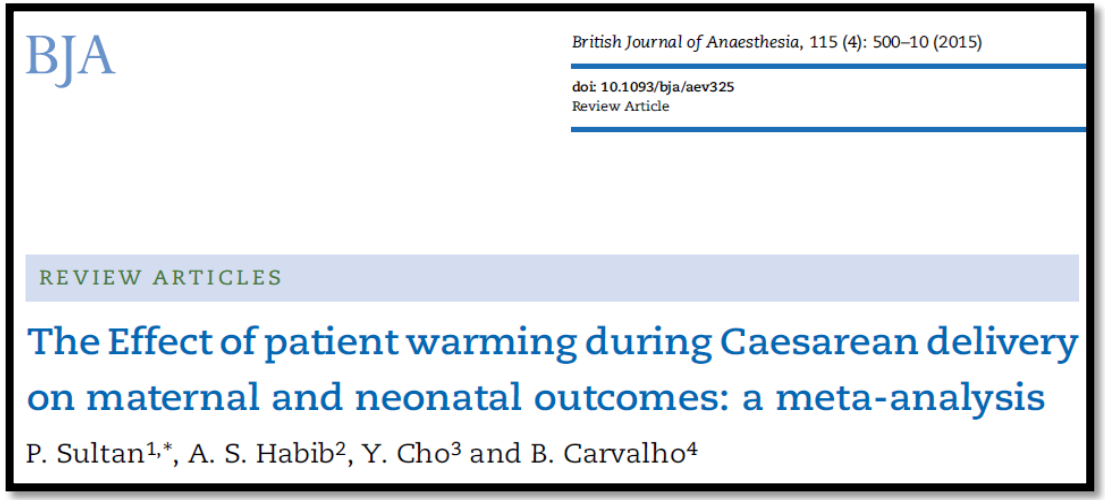
Table 2. Anesthetic and Surgical Data

	Forced air-warming (n = 15)	Control (n = 15)
Intraoperative ambient temperature (°C)	23.0 ± 1.2	23.0 ± 1.1
Recovery area ambient temperature (°C)	23.4 ± 1.2	23.5 ± 1.1
Anesthesia initiation to skin incision interval (min)	15 ± 4	16 ± 4
Duration of surgery (min)	41 ± 10	52 ± 17
Postoperative recovery admission to discharge interval (min)	61 ± 12	66 ± 16
Highest spinal block height during study period	T3 (T1–T4)	T3 (T2–T5)
Intraoperative fluids (mL)	1340 ± 269	1419 ± 359
Estimated blood loss (mL)	674 ± 183	640 ± 123

Data are presented as mean ± SD and median (range).

P = NS between the study groups.

Fluid warming in Cesarean cases



BJA

British Journal of Anaesthesia, 115 (4): 500–10 (2015)

doi: 10.1093/bja/aev325
Review Article

REVIEW ARTICLES

The Effect of patient warming during Caesarean delivery on maternal and neonatal outcomes: a meta-analysis

P. Sultan[1,*], A. S. Habib[2], Y. Cho[3] and B. Carvalho[4]

- Meta-analysis using randomized control trials utilizing forced air warming or warmed fluid within 30 min of neuraxial placement
- N= 13 studies:
  - 416 patients warmed with FAW or warm fluids
  - 373 patients in control group (no warming)
- Suggests FAW or warmed fluids should be used for elective cesareans.

Obstetric Active Warming Literature: Forced Air vs. Passive

Active Warming During Cesarean Delivery

Ernst-Peter Horn, MD*, Frank Schroeder, MD*, Andrè Gottschalk, MD*, Daniel I. Sessler, MD†, Natascha Hiltmeyer, MD*, Thomas Standl, MD*, and Jochen Schulte am Esch, MD*

*Department of Anesthesiology, University Hospital Hamburg-Eppendorf, Hamburg, Germany; and the †Outcomes Research™ Institute and Department of Anesthesiology, University of Louisville, Louisville, Kentucky

- 30 patients randomly assigned forced air warming or passive insulation
- Core temperatures after 2 h of anesthesia were greater in the actively warmed (37.1°C ± 0.4°C) compared to unwarmed (36.0°C ± 0.5°C;$P < 0.01$) patients.
- Shivering was observed in 2 of 15 warmed vs. 9 of 15 unwarmed mothers ($P < 0.05$).

Obstetric Active Warming Literature: Fluid Warming + Forced Air Warming

Observational Study > Ann Afr Med. 2020 Apr-Jun;19(2):137-143. doi: 10.4103/aam.aam_58_19.

The effect of combination of warm intravenous fluid infusion and forced air warming versus forced air warming alone on maternal temperature and shivering during cesarian delivery under spinal anesthesia

V S Meghana [1], Sunil Baikadi Vasudevarao [1], Shaila S Kamath [1]

Affiliations + expand

PMID: 32499471 PMCID: PMC7453949 DOI: 10.4103/aam.aam_58_19

Free PMC article

Table 2: Difference in core body tympanic temperature (°C) pre- and post-spinal between warm air and warm infusion groups (*n*=100)

	Mean±SD		*t*	*P*
	WA (*n*=50)	WI (*n*=50)		
Prespinal	37.36±0.12	37.31±0.23	1.175	0.243
Postspinal	37.15±0.11	37.20±0.25	−1.193	0.236
5 min	36.98±0.13	37.00±0.32	−0.332	0.740
15 min	36.68±0.18	36.79±0.31	2.070	0.041*
25 min	36.50±0.28	36.52±0.35	−0.377	0.707
35 min	36.21±0.36	36.51±0.52	−3.341	0.001**
45 min	36.08±0.36	36.73±0.42	−5.005	0.000**
55 min	36.06±0.36	36.73±0.42	−4.342	0.000**

*Significant. **Highly significant. SD=Standard deviation, WA=Forced air warmer, WI=Warm IV fluid +Forced air warmer

100 patients scheduled for elective c-section:

- 50 patients warmed with IV fluid infusion + forced air warmer
- 50 patients warmed with only forced air warmer

Core body temp and shivering incidence recorded:
Every 10min from prespinal -> end of surgery & 0, 15, and 30 minutes after arrival in PACU

Fluid warming + forced air warming maintained slightly warmer near core body temperatures postoperatively & reduced shivering compared to those warming with forced air alone.

Obstetric Active Warming Literature: Fluid Warming + Forced Air

OBSTETRIC ANESTHESIOLOGY: RESEARCH REPORT

Active Warming Utilizing Combined IV Fluid and Forced-Air Warming Decreases Hypothermia and Improves Maternal Comfort During Cesarean Delivery: A Randomized Control Trial

Cobb, Benjamin MD*; Cho, Yuri MD†; Hilton, Gillian MBChB, FRCA*; Ting, Vicki MD‡; Carvalho, Brendan MBBCh, FRCA, MDCH*

Author Information

Anesthesia & Analgesia: May 2016 - Volume 122 - Issue 5 - p 1490-1497
doi: 10.1213/ANE.0000000000001181

- RCT including 46 women undergoing scheduled cesarean delivery with spinal
- 23 in control and 23 intervention
- Intervention = warmed IV fluid + lower body forced-air warmer
- Control = No warming, blankets only
- Intervention group warmer in PACU & improved comfort; no other significant findings related to intraop shivering, Apgar scores, umbilical vein blood gas values

TEMP 01 Discussion

- Literature is limited to small studies & focused primarily on forced air warming +/- fluid warming
- Continue to include cesarean deliveries?
- Continue to include fluid warmers as active warming?
- Other considerations?
- Poll:
  - Include c-sections in TEMP 01 (yes/no)
  - If yes, include fluid warmers as active warming?

GA-03-OB Specification: DRAFT

Description:

Percentage of cesarean delivery cases converted to general anesthesia after epidural

- GA-03b-OB: Percentage of cesarean delivery cases converted to general anesthesia after combined spinal epidural

Inclusion:

Cesarean delivery cases with epidural anesthesia administered

- GA-03b-OB: Cesarean delivery cases with combined spinal epidural

Exclusion:

- Cesarean Hysterectomies as determined by the "Obstetric Anesthesia Type" Phenotype.
- Non-cesarean delivery cases, including labor epidural only cases
- Cesarean delivery cases without epidural placement (or CSE for GA-03b)

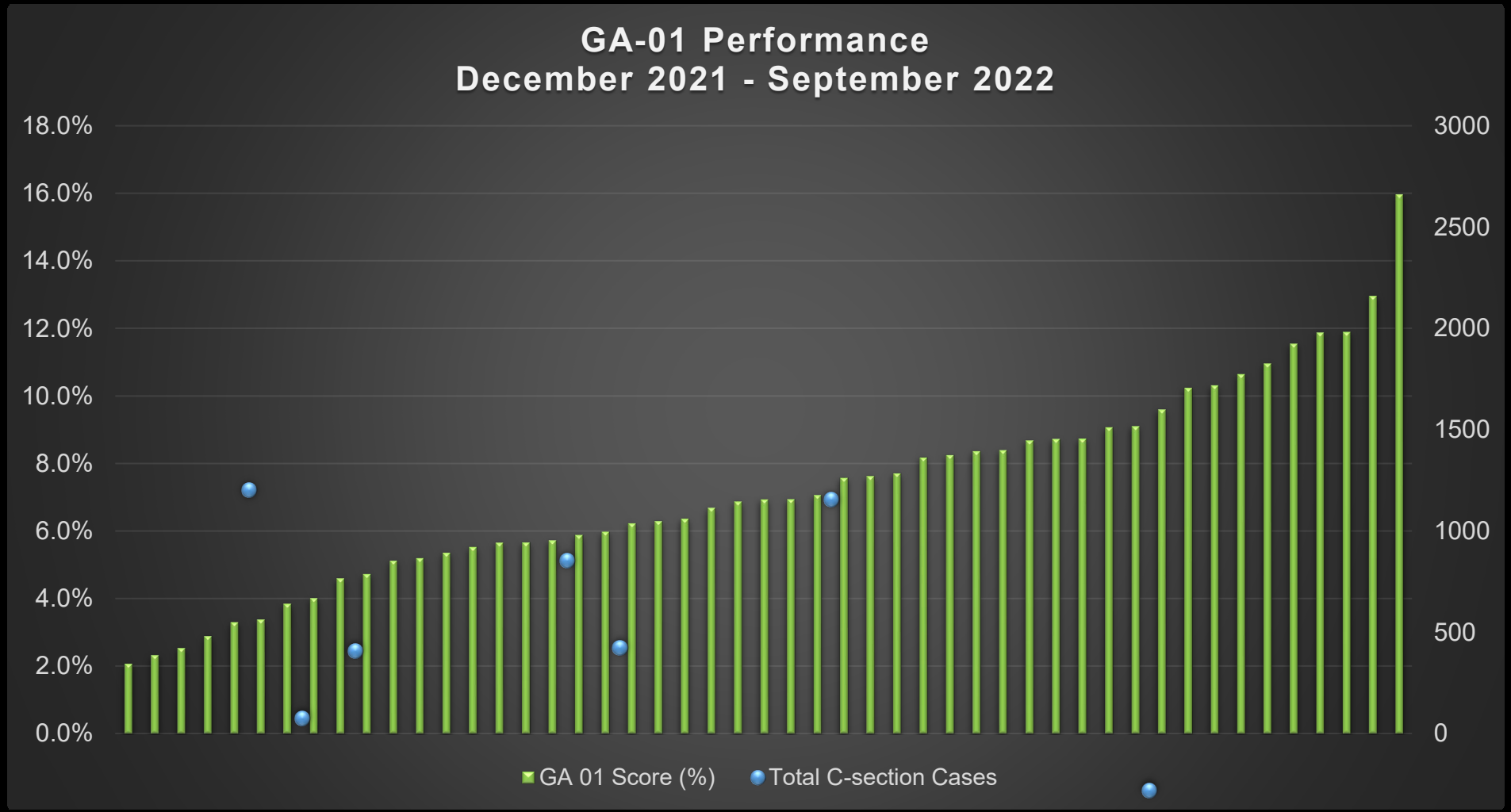
GA-03 Considerations

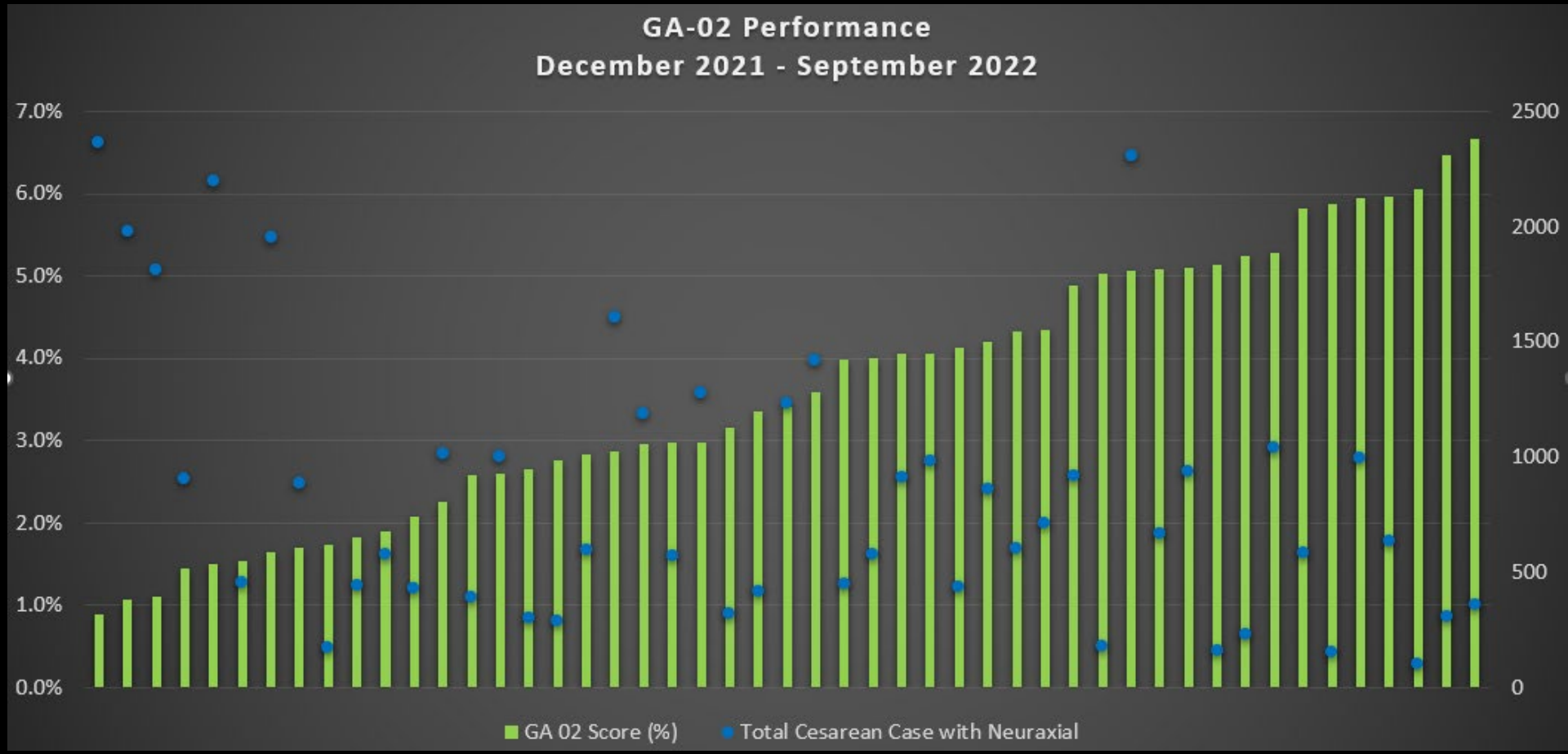
- Added exclusion for cases that were converted to GA >=75 minutes after neonate delivery (attempting to exclude cases that were clearly converted for medical reasons, not failed epidurals)
- Cases converted to GA before neonate delivery and after epidural placement will be included, regardless of reason for conversion
- Unfortunately, documentation is not standardized enough to weed out a medical reason vs. failed epidural

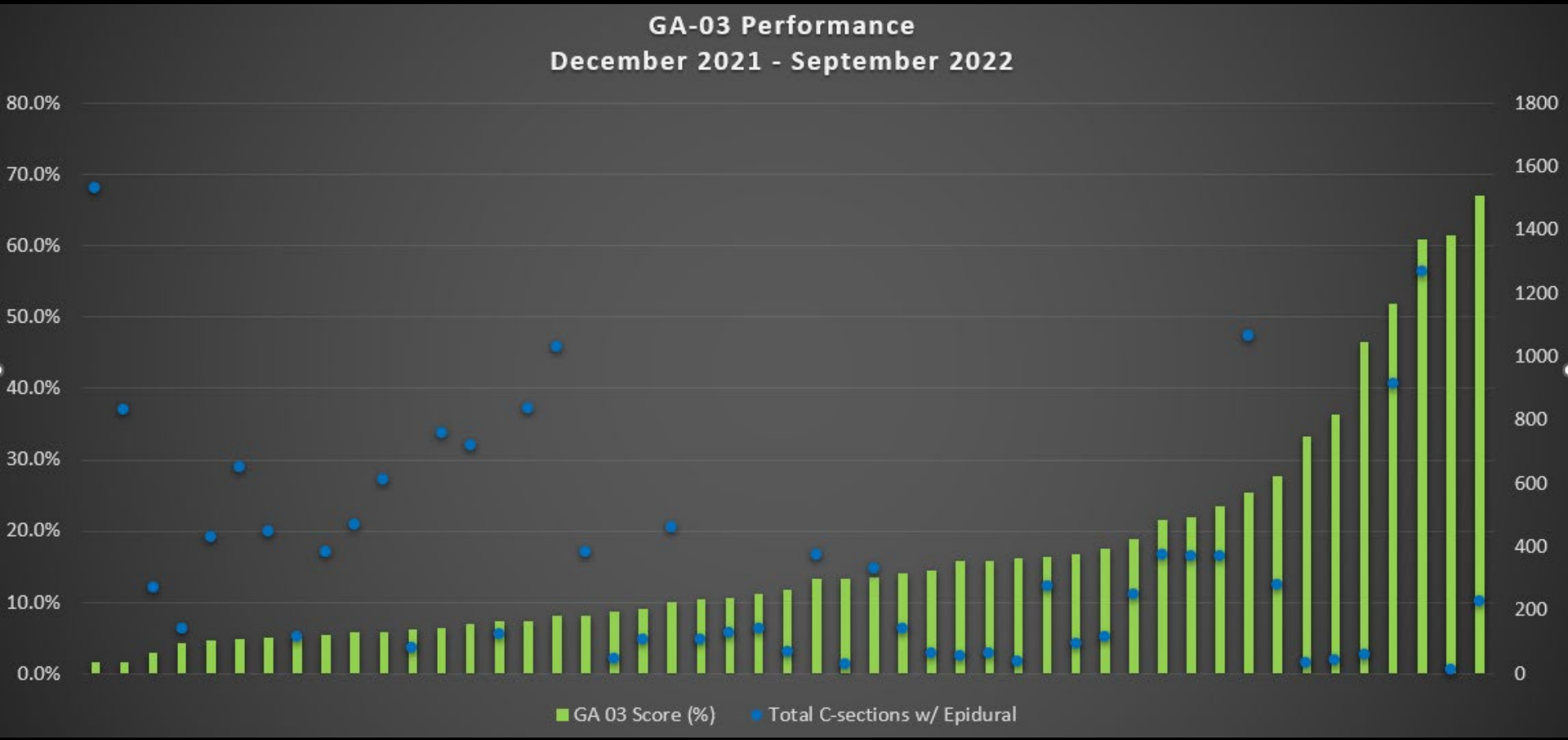
Review of Existing General Anesthesia Measures for Cesarean Delivery

- GA-01-OB: Percentage of cesarean delivery cases where GA was used
- GA-02-OB: Percentage of cesarean delivery cases where GA was administered after neuraxial anesthesia
- GA-03-OB: Percentage of cesarean delivery cases converted to general anesthesia after epidural
- GA-03b-OB: Percentage of cesarean delivery cases converted to general anesthesia after combined spinal epidural

MPOG


GA-01 Performance
December 2021 - September 2022
18.0%
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
3000
2500
2000
1500
1000
500
0
GA 01 Score (%)
Total C-section Cases


GA-02 Performance
December 2021 - September 2022
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
2500
2000
1500
1000
500
0
GA 02 Score (%)
Total Cesarean Case with Neuraxial


GA-03 Performance
December 2021 - September 2022
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
1800
1600
1400
1200
1000
800
600
400
200
0
GA 03 Score (%)
Total C-sections w/ Epidural

GA-03-OB Next Steps

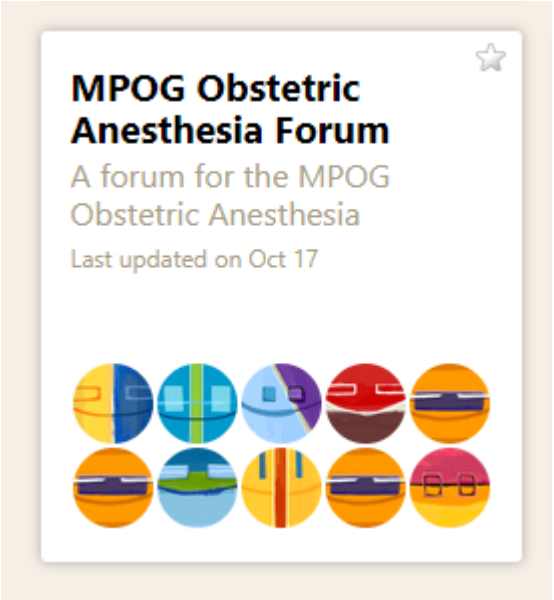
- Neuraxial and Obstetric Anesthesia Type phenotypes need some revisions before we make this measure public on dashboards
- Any other considerations?
- Does the group want to move forward with this measure?

Oxytocin Dosing

Basecamp Discussion – July 2022

- Post regarding oxytocin dosing at other sites for cesarean delivery

- Practices reported on forum:
  - No bolus; first infusion: 30U over 1 hour + second infusion 30U over 4 hours
  - No bolus; first infusion: 80U over 1 hour + second infusion 30U over 4 hours
  - Bolus dose of 1.2U with infusion 15U/hr x ~2 hours
  - Bolus dose of 3U with infusion of remaining 27U at a rate of 45U/hour
  - No bolus; first infusion: 18U over 1 hour + ? Second infusion at discretion of obstetrician



Oxytocin for Cesarean Delivery: Literature Review

Anaesthesia 2019, 74, 1305–1319 doi:10.1111/anae.14757

Guidelines

International consensus statement on the use of uterotonic agents during caesarean section

M. Heesen,[1] B. Carvalho,[2] J. C. A. Carvalho,[3] J. J. Duvekot,[4] R. A. Dyer,[5] D. N. Lucas,[6] N. McDonnell,[7] S. Orbach-Zinger[8] and S. M. Kinsella[9]

Box 1 Suggested dose regimens for uterotonic administration at low-risk elective caesarean section, and caesarean section in labouring women. N.B. take account of national drug license restrictions. See text for further information.

First-line drugs

Oxytocin

Elective caesarean section	Intrapartum caesarean section
Bolus 1 IU oxytocin; start oxytocin infusion at 2.5–7.5 IU.h^{-1} (0.04–0.125 IU.min^{-1}).	3 IU oxytocin over ≥ 30 s; start oxytocin infusion at 7.5–15 IU.h^{-1} (0.125–0.25 IU.min^{-1}).
If required after 2 min, give a further dose of 3 IU over ≥ 30 s.	
Consider second-line agent early in the event of failure of this regimen to produce sustained uterine tone.	
Review the patient's clinical condition before discontinuing the infusion; this will usually be between 2 h and 4 h after commencement.	

International Consensus Statement

Also includes recommendations for second-line medications (beyond the oxytocin recommendations):

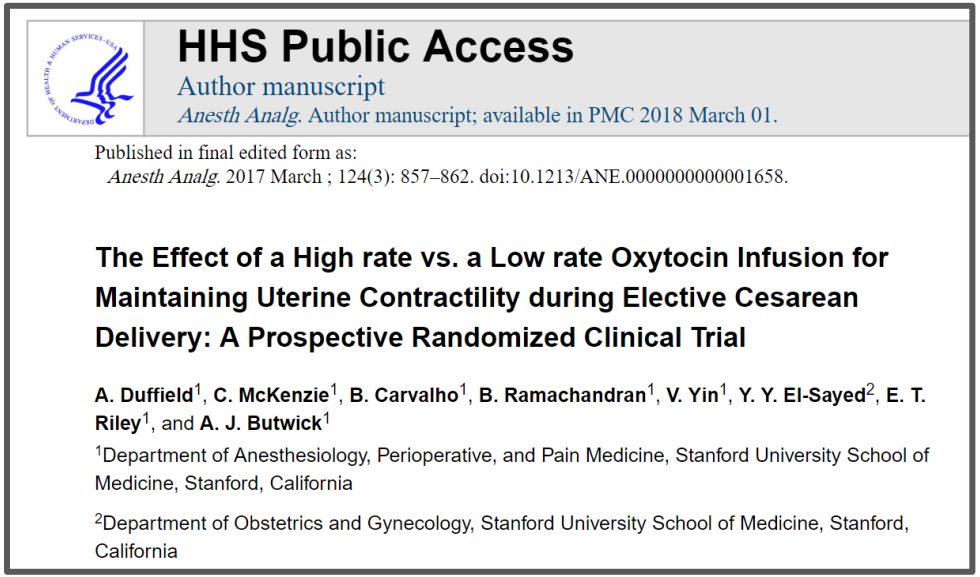
Second-line drugs

These drugs should be considered for both prophylaxis and treatment of postpartum haemorrhage.
Consider early use in the event of failure of first-line drugs to produce sustained uterine tone.
Depending on local availability, the following drugs can be used:

1. Ergometrine (ergonovine) 200–500 µg/methylergometrine (methylergonovine) 200 µg: i.m., or slow i.v. in exceptional circumstances; may be repeated after 2 h.
2. Misoprostol 400–600 µg: sublingual, rectal, vaginal, oral; repeat after 15 min if required, maximum dose 800 µg.
3. Carboprost 250 µg: i.m. or intramyometrial (contraindicated i.v.); up to every 15 min if required, maximum eight doses.
4. Sulprostone 500 µg: i.v. at 100 $\mu g.h^{-1}$; maximum dose 1500 µg.

Consider early use of adjunctive medication to counter adverse effects, for example, antiemetics.
Further uterotonic administration (third-line drugs) should be considered within a multimodal postpartum haemorrhage regimen (pharmacology/haematology and antifibrinolysis/surgery/interventional radiology).

Literature review: Dose effectiveness



Published in final edited form as:
Anesth Analg. 2017 March ; 124(3): 857–862. doi:10.1213/ANE.0000000000001658.

The Effect of a High rate vs. a Low rate Oxytocin Infusion for Maintaining Uterine Contractility during Elective Cesarean Delivery: A Prospective Randomized Clinical Trial

A. Duffield[1], **C. McKenzie**[1], **B. Carvalho**[1], **B. Ramachandran**[1], **V. Yin**[1], **Y. Y. El-Sayed**[2], **E. T. Riley**[1], and **A. J. Butwick**[1]

[1]Department of Anesthesiology, Perioperative, and Pain Medicine, Stanford University School of Medicine, Stanford, California

[2]Department of Obstetrics and Gynecology, Stanford University School of Medicine, Stanford, California

- Prospective, randomized, double-blind trial including 51 women:
- All women received bolus of 1U after delivery of neonate +
  - 24 women received infusion 2.5 U/hr
  - 27 women received infusion 15 U/hr
- EBL (634mL vs. 512mL; p-value=0.7)
- PPH rates & uterine tone did not differ between low and high infusion groups either

MPOG Coordinating Center Review

- Reviewed 238 Cesarean cases across 49 sites for dosing and bolus amount as well as timing of first dose.

- For sites that bolus off pump, MPOG unable to determine dose amounts (not consistently documented)

- This preliminary review showed:
  - No standard bolus amount (1-6 units).
  - No standard infusion rate was found among sites.

- Discussion…and poll

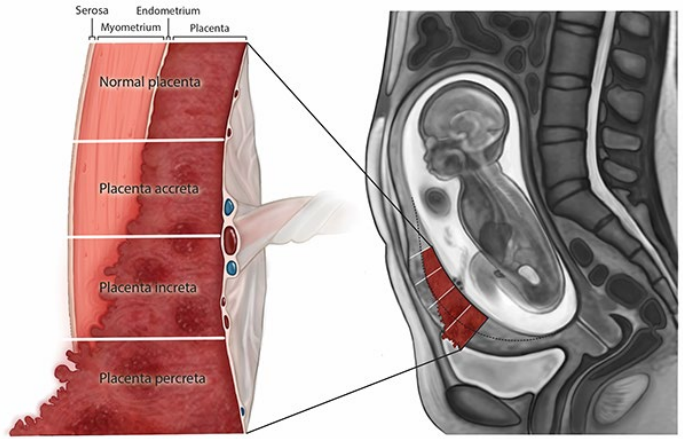
Anesthetic Management of Cesarean Hysterectomy for Placenta Accreta Spectrum

Nicole Zanolli & Dr. Ashraf Habib

DukeHealth

Background

- Placenta accreta spectrum (PAS) can complicate delivery leading to massive hemorrhage
- Patients with suspected cases of PAS are often scheduled for cesarean hysterectomy



Gaps

- Current literature lacks large multicenter studies that address optimal anesthetic management of cesarean hysterectomy for PAS

https://radiology.ucsf.edu/blog/ucsf-radiologys-role-multidisciplinary-approach-placenta-service-maps-ucsf

Primary objective

- Provide a descriptive analysis of anesthetic management of cesarean hysterectomy for PAS

Secondary objective

- Compare the anesthetic management and outcomes between cases performed under general, neuraxial or combined neuraxial/general anesthesia
  - **Primary comparison**: transfusion requirements

Study design: retrospective cohort study

- Inclusion Criteria
  - January 1, 2015- December 31, 2021
  - “Cesarean Hysterectomy” in OBAT phenotype
    - MPOG case reviewer to insure will manually reviewed
- Exclusion Criteria
  - Patients <13 years of age
  - Length of procedure <15 minutes
  - Procedures occurring after cesarean hysterectomy

Progress

- Completed single center review of PAS cases at Duke
  - High quality data for fluid and blood administration, intraoperative drug administration, pre and post op CBC's
- Received PCRC approval
  - Optimized identification of cesarean hysterectomies performed for PAS
- Planning for individual case review
  - Address limitations
    - Post op destination: ICU vs floor
    - Type of PAS
    - Planned vs unplanned procedure

THANK YOU!

Monica Servin, MD

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MULTICENTER PERIOPERATIVE OUTCOMES GROUP