

Impact of Monitored Anesthesia Care for Gastrointestinal Endoscopy Procedures in the Veteran Population

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Objectives

- Ability to identify the risks and benefits of monitored anesthesia care versus moderate sedation for gastrointestinal endoscopy procedures.
- To understand the cost analysis of utilizing monitored anesthesia care versus moderate sedation for gastrointestinal endoscopy procedures.
- Describe the project's limitations and potential challenges to implementing a practice change at the target facility.

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Introduction and Background

- ~22 million GI endoscopies performed annually (2018)
 - EGDs and colonoscopies most common
- Sedation for GI endoscopies
 - Moderate sedation
 - Monitored anesthesia care
 - Increasing in popularity

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Introduction and Background

- Moderate sedation
 - Respond purposefully to verbal/tactile stimuli, maintain ventilatory and cardiovascular function without intervention
 - Administered by an RN under direction of the proceduralist
 - Achieved with benzodiazepines and short-acting opioids
 - Midazolam
 - Fentanyl
 - Risks: respiratory depression, overdose, inadequate level of sedation, prolonged recovery in elderly patients

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Introduction and Background

- Monitored anesthesia care (MAC)
 - A specific anesthesia service performed by a qualified anesthesia provider
 - Levels of sedation: minimal sedation, moderate sedation, deep sedation, general anesthesia
 - Goal = deep sedation
 - Primary anesthetic agent: Propofol
 - Risks: cardiovascular depression, hypotension, ventilatory depression
 - Potential benefits: faster recovery and discharge times, improved patient satisfaction, improved procedural conditions, decreased costs

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Purpose

- Identify the method of sedation (MAC vs. moderate sedation) that produces more optimal outcomes in the veteran population receiving GI endoscopies
- Determine if a change in practice is feasible and beneficial at the target facility

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Review of Literature

- Sedation for GI endoscopies
 - Recommended depth of sedation?
 - American Society for Gastrointestinal Endoscopy (ASGE) clinical practice guideline (2018)
 - MAC should be reserved for complex endoscopic procedures, patients with multiple comorbidities, or patients at risk for airway compromise
 - Propofol-based sedation when it is expected to improve patient safety, patient comfort, procedural efficiency, or successful procedural completion

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Review of Literature

- Endoscopy performance
 - Faster time to cecum with MAC (Ng et al., 2018)
 - Moderate sedation: 21 minutes
 - MAC: 17 minutes
 - Shorter procedure times with MAC
 - No difference in adenoma/polyp detection rates

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Review of Literature

- Patient safety
 - MAC vs. moderate sedation
 - Anesthesia as airway experts

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Review of Literature

- Patient satisfaction
 - Increased patient satisfaction associated with MAC
 - Less intraoperative discomfort
 - Increased amnesia of the procedure
 - Improved cognition following the procedure
 - Patients who received MAC more often preferred the same method of sedation for future procedures

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Review of Literature

- Cost effectiveness
 - Shorter procedure times with MAC
 - Shorter recovery room times with MAC
 - Increased costs related to the utilization of an anesthesia provider

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Project Design

- IRB determination
 - UW-Oshkosh, VA
- Setting: Wisconsin VA outpatient surgery center
 - CRNA only
- Retrospective chart review
- Pilot program
 - Staff survey

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Retrospective Chart Review

- **Population:**
 - Sample size (N) = 402
 - MAC: N = 63
 - Colonoscopies: N = 32
 - EGDs: N = 17
 - Doubles: N = 14
 - Moderate sedation = 339
 - Colonoscopies: N = 242
 - EGDs: N = 68
 - Doubles: N = 29

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Retrospective Chart Review

- **Measured variables:**
 - In room to procedure start time (min)
 - Time out to procedure start time (min)
 - Procedure time (min)
 - Time to cecum (min)
 - Procedure end to out of room time (min)
 - In room time (min)
 - Recovery room time (min)
 - Medication doses

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Retrospective Chart Review - Results

		In room to procedure start (min)	Time out to procedure start (min)	Procedure time (min)	Time to cecum (min)	Procedure end to out of room (min)	In room time (min)	Recovery room time (min)
Colonoscopy	MAC	8:46.88	4:24.38	23:58.12	8:01.87	7:20.62	40:05.62	43:45.00
	MS	10:52.07	6:53.31	23:50.83	8:09.17	8:06.45	42:46.86	42:45.62
Double	MAC	8:21.43	4:47.14	32:29.99	5:55.71	7:55.71	48:47.14	44:51.43
	MS	10:47.59	6:12.41	38:28.97	7:37.24	10:18.62	59:35.17	45:06.21
EGD	MAC	7:38.82	4:24.71	8:24.71	-	10:24.71	26:28.24	43:38.82
	MS	12:59.12	6:21.18	8:30.00	-	11:38.82	33:07.94	44:05.29

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Retrospective Chart Review - Results

■ Independent samples T-test:

	MAC	MS	P-value
In room to procedure start (min)	*8:22.86*	*11:17.17*	< 0.001
Time out to procedure start (min)	*4:29.52*	*6:43.36*	< 0.001
Time to cecum (min)	7:23.48	8:05.76	0.288
Procedure end to out of room (min)	8:18.10	9:00.35	0.389
Recovery room time (min)	43:58.10	43:13.63	0.579

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Retrospective Chart Review - Results

- One-Way ANOVA:
 - Colonoscopy – MAC vs. MS

	Mean difference (MAC – MS)	P-value
In room to procedure start (min)	-2:05.2	0.372
Time out to procedure start (min)	*-2:28.9*	< 0.001
Procedure time (min)	-0:07.3	1.00
Procedure end to out of room (min)	-0:45.8	0.898
In room time (min)	-2:41.2	0.891
Recovery room time (min)	0:59.38	0.995

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Retrospective Chart Review - Results

- One-Way ANOVA:
 - Double – MAC vs. MS

	Mean difference (MAC – MS)	P-value
In room to procedure start (min)	-2:26.2	0.775
Time out to procedure start (min)	-1:25.3	0.344
Procedure time (min)	-5:58.9	0.601
Procedure end to out of room (min)	-2:22.9	0.399
In room time (min)	-10:48.0	0.126
Recovery room time (min)	-0:14.8	1.000

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Retrospective Chart Review - Results

- One-Way ANOVA:

- EGD – MAC vs. MS

	Mean difference (MAC – MS)	P-value
In room to procedure start (min)	*-5:20.3*	0.008
Time out to procedure start (min)	*-1:56.5*	0.014
Procedure time (min)	-0:05.3	1.000
Procedure end to out of room (min)	-1:14.1	0.843
In room time (min)	-6:39.7	0.434
Recovery room time (min)	-0:26.5	1.000

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Retrospective Chart Review - Results

- Medication utilization:

- Medication costs:

Midazolam (2 mg/2 mL)	\$0.28
Fentanyl (100 mcg/2 mL)	\$0.96
Diphenhydramine (50 mg/1 mL)	\$0.96
Propofol (200mg/20mL)	\$1.60
Propofol (1,000 mg/100 mL)	\$5.00
Ketamine (50 mg/5 mL)	\$6.92

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Retrospective Chart Review - Results

- Medication utilization

- Moderate sedation:

	Median dose	Max dose	Median cost	Max cost
Midazolam	6 mg	10 mg	\$0.84	\$1.40
Fentanyl	100 mcg	200 mcg	\$0.96	\$1.92
Diphenhydramine	0 mg	50 mg	\$0.00	\$0.96

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Retrospective Chart Review - Results

- Medication utilization

- MAC:

	Median dose	Max dose	Median cost	Max cost
Propofol	420 mg	1,150 mg	\$4.80-\$5.00	\$6.60
Midazolam	0 mg	4 mg	\$0.00	\$0.56
Fentanyl	0 mcg	100 mcg	\$0.00	\$0.96
Diphenhydramine	0 mg	50 mg	\$0.00	\$0.96
Ketamine	0 mg	100 mg	\$0.00	\$13.84

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Staff Survey

- Population:
 - Sample size (N)
 - Proceduralists: N = 0
 - RNs: N = 4
 - Techs: N = 1
 - CRNAs: N = 4

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Staff Survey – Proceduralists

The time required to complete the “moderate sedation clinician pre-assessment” note impacts my workflow.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel I could complete more procedures in the GI suite if I did not need to complete the “moderate sedation clinician pre-assessment”.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am confident in my ability to complete the airway examination and Mallampati airway assessment.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am confident in my ability to detect a difficult airway during the “moderate sedation clinician pre-assessment”.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am confident in my ability to identify patients at high risk for obstructive sleep apnea.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am confident in my ability to identify and handle an airway emergency.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

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Staff Survey – Proceduralists

Which anesthetic technique seems to produce increased ease with which to complete the intended GI endoscopy procedure?	Moderate Sedation	MAC	No Difference
Which anesthetic technique seems to produce a decreased frequency of requiring manual abdominal pressure for colonoscopies?	Moderate Sedation	MAC	No Difference
Which anesthetic technique seems to produce faster procedure times?	Moderate Sedation	MAC	No Difference
Which anesthetic technique do you believe increases patient safety?	Moderate Sedation	MAC	No Difference
Which anesthetic technique seems to produce increased patient comfort throughout the GI endoscopy procedure?	Moderate Sedation	MAC	No Difference

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Staff Survey – Proceduralists

I rate my satisfaction with the moderate sedation practice model as:	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
I rate my satisfaction with the MAC practice model as:	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
If I had the option to schedule all GI procedures with MAC, I would prefer to:	Continue with the current practice		Convert all GI procedures to MAC		

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Staff Survey - Results

■ **RNs: N = 4**

I am confident in my ability to identify and handle an airway emergency.	75% strongly agree 25% strongly disagree
Which anesthetic technique seems to produce a decreased frequency of requiring manual abdominal pressure for colonoscopies?	100% no difference
Which anesthetic technique seems to produce faster procedure times?	25% MAC 75% no difference
Which anesthetic technique do you believe increases patient safety?	25% MAC 75% no difference
Which anesthetic technique seems to produce increased patient comfort throughout the procedure?	50% MAC 50% no difference

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Staff Survey - Results

■ **RNs, continued:**

Which anesthetic technique seems to produce shorter recovery room times?	50% MAC 50% no difference
Which anesthetic technique seems to produce faster return to baseline vital signs?	100% no difference
Which anesthetic technique seems to produce faster return to baseline neurologic status?	25% moderate sedation 50% MAC 25% no difference
Which anesthetic technique seems to produce increased ease with which to complete the intended procedure?	75% MAC 25% no difference

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Staff Survey - Results

■ RNs, continued:

I rate my satisfaction with the moderate sedation practice model as:	25% somewhat satisfied 75% very satisfied
I rate my satisfaction with the MAC practice model as:	25% somewhat satisfied 75% very satisfied
If I had the option to schedule all GI procedures with MAC, I would prefer to:	100% continue with the current practice

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Staff Survey - Results

■ Techs: N = 1

Which anesthetic technique seems to produce a decreased frequency of requiring manual abdominal pressure for colonoscopies?	100% MAC
Which anesthetic technique seems to produce faster procedure times?	100% MAC
Which anesthetic technique do you believe increases patient safety?	100% MAC
Which anesthetic technique seems to produce increased patient comfort throughout the procedure?	100% MAC
Which anesthetic technique seems to produce increased ease with which to complete the intended procedure?	100% MAC

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Staff Survey - Results

■ Techs, continued:

I rate my satisfaction with the moderate sedation practice model as:	100% somewhat satisfied
I rate my satisfaction with the MAC practice model as:	100% very satisfied
If I had the option to schedule all GI procedures with MAC, I would prefer to:	100% convert all GI procedures to MAC

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Staff Survey - Results

■ CRNAs: N = 4

I feel that the workload for the CRNAs at the VA outpatient surgery center has the capacity to be increased.	25% somewhat disagree 75% strongly agree
I feel that it would be feasible for CRNAs to be utilized for all GI procedures with the current staffing.	25% strongly disagree 50% somewhat disagree 25% strongly agree
I feel that patient safety during GI procedures is increased with the presence of an anesthesia provider.	25% strongly disagree 25% somewhat disagree 50% strongly agree
If I had the option to schedule all GI procedures with MAC, I would prefer to:	50% continue with the current practice 50% convert all GI procedures to MAC

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Discussion

- Summary:
 - MAC: **faster in room to procedure start, time out to procedure start**, procedure time (doubles), procedure end to out of room, and in room time
 - MAC: higher medication costs
- Limitations:
 - Small, disproportionate sample sizes
 - Recovery room times
 - Limited generalizability

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Future Design

- Pilot program
 - MAC 3 days/week
 - Staff surveys

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Practice Implications

- Sustained practice change
 - Limitations: staff pushback
 - Staff surveys
- Future studies:
 - Patient satisfaction
 - Patient safety
 - Additional healthcare organizations

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Questions?

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