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Characterizing the Anesthetic Management of Patients Undergoing Transradial Cardiac and Cerebrovascular Interventions: A Single-Institution Study

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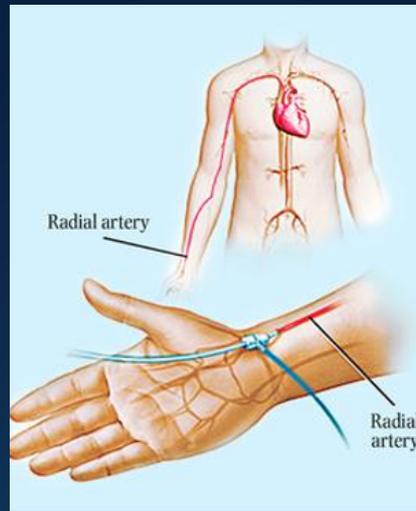


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Characterizing the Anesthetic Management of Patients Undergoing Transradial Cardiac and Cerebrovascular Interventions: A Single-Institution Study

Steven Bieser, Somnath Das, Lohit Velagapudi, Heli Patel, Joshua Weinberg, Lisa Moss, Marguerite Davis, Nicholas Ruggiero, Pascal Jabbour, Victor Romo*

(* indicates primary project advisor)



Introduction

- Transradial approaches are shown to reduce mortality, morbidity, access-site complications, hospital stay and costs when compared to the transfemoral approach in multiple cardiac trials. (Mitchell, Hong, Lee et al., 2012)
- Use of the antispasmodic cocktail for these interventions poses challenges for anesthetic management especially of Mean Arterial Pressure is absent in the literature. Thus, a review of pre-procedure variables that may impact safety of these procedures in addition to analysis of antispasmodic cocktail dosage's effect on blood pressure is needed.
- Differing anesthetic practices between Neuro-interventional and Cardiac fields may need to be consolidated. This study may offer opportunities to explore the consolidation of practices.



- Cerebral angiography is classically performed using a transfemoral approach. The transradial approach has gained interest due to its success in cardiac angiography with lowering bleeding and vascular complications and improving patient satisfaction (Mitchell, Hong, Lee et al., 2012)
- Need for antispasmodic cocktail?
 - Radial artery spasm is a common complication of using a transradial approach to cerebral angiography. To prevent this, a cocktail of vasodilators is infused after puncture of the artery and insertion of an introducer sheath.
 - Studies by Mouchtouris, Saiegh, Sweid et al., 2019, looked at the use of nicardipine (cardene) and nitroglycerin in neurological procedures, finding that while vasodilator cocktail given intraarterially effectively prevented vasospasm, it could cause systemic hypotension, requiring administration of fluids or vasopressors by the anesthesiologist.
 - Our study builds upon this in addition to the systemic review conducted by (Kwok, Rashid, Fraser et al., 2015) that characterized the efficacy and safety of vasodilators used for the prevention of radial artery spasm in transradial cardiac angiography

Objectives & Hypothesis

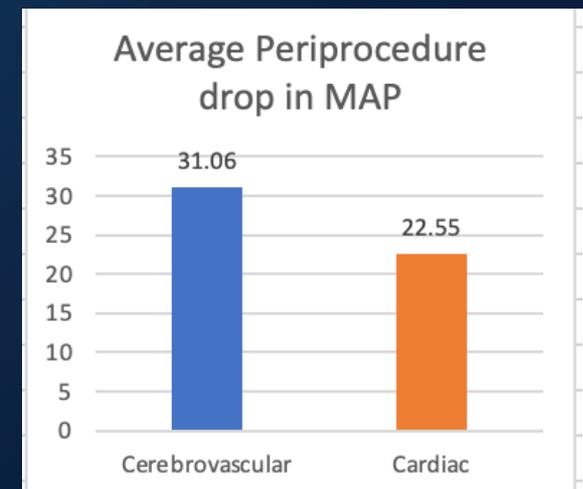
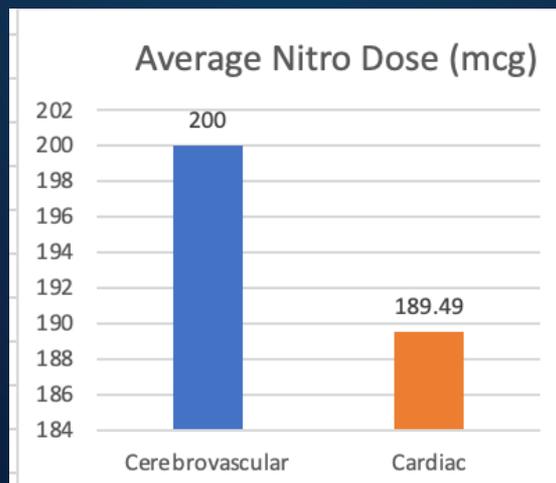
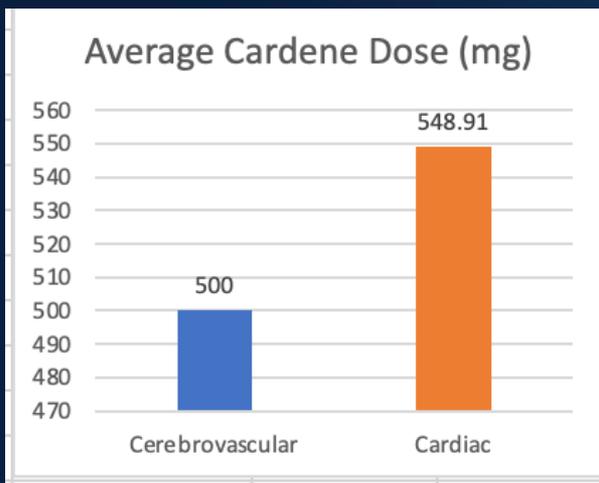
- Research Question
 - This study aims to characterize the safety profile, in terms of in-procedure complication risk, of cardiac and neuroanesthetic management protocols for transradial interventions using the anti-spasmodic cocktail, in adults undergoing diagnostic cardiac angiography and cerebrovascular interventional procedures.
- Hypothesis
 - The anti-spasmodic cocktail is safe to give to patients undergoing transradial catheter approach for cardiac and cerebrovascular interventions from an anesthetic perspective.

Approach & Results

- Study design: Retrospective Chart Review
- Population:
 - Adult patients who underwent diagnostic cardiac and cerebrovascular interventions at TJUH in 2018-2020
- Intervention
 - Data on 42 variables including age, sex, comorbidities, prior antihypertensive medications, dose of radial antispasmodic cocktail, sedation dose, and periprocedural blood pressure changes were collected.
 - Goal is to characterize safety profile so any complications, especially vasospasm and significant drop in MAP were searched for in this study.
- Data source and collection:
 - All Epic charts for patients who underwent these two procedures were aggregated and reviewed
- Rationale for Approach
 - Best way to identify trends in anesthetic outcomes and to identify any risk factors associated with the transradial approach and anti-spasmodic cocktail is retrospective review.

Approach & Results

- A total 195 Cerebrovascular patients and 187 Cardiac patients were collected, notably: zero of the patients experienced vasospasm complications with use of the radial cocktail.
- A Student's T-test and ANOVA were utilized, this study is primarily a descriptive analysis
- Cerebrovascular patients received an average of 500.00 mg of cardene (a standard dose) while cardiac patients received an average of 548.91 mg of cardene (SD: 346.47). (Dosed dynamically)
 - Interestingly the Cerebrovascular Arm received their cardene over 1 injections while the Cardiac Arm received their cardene over 3.2 injections on average
- Cerebrovascular patients received an average of 200.00 mcg of Nitroglycerin (standard dose) while cardiac patients received an average of 189.49 mcg of Nitroglycerin (SD: 271.26) dosed dynamically.
- MAP drop was 31.06 mmHg for Cerebrovascular and 22.55 mmHg for Cardiac. P-value= $<.001$
- Pressors given by the Anesthesiologist to restore BP were given in 67.7% of Cerebrovascular patients and .5% of Cardiac. Zero patients in either arm experienced vasospasm indicating that pressor administration does not increase risk of vasospasm.





Conclusions

- Our data supports our hypothesis that anesthetic management with the anti-spasmodic cocktail in transradial approach has a favorable safety profile for both our cardiac and cerebrovascular patients due to the marked absence of vasospasm or other complications.
- Our findings align well with current literature understanding that this approach is safe in cardiac angiography and shows a favorable safety profile in cerebrovascular interventions as well.
- Our study demonstrates that use of the anti-spasmodic cocktail is safe from an anesthetic perspective for both procedures and that pressors can be safely used to maintain MAP in cerebrovascular procedures.
 - Of interest is the increased drop in MAP in cerebrovascular patients compared to cardiac patients.
 - Neuro procedures times are longer on average and include use of anesthetics like propofol that can greatly alter BP which may be contributing to the need for pressors. This is an area in need of further investigation.



Future Directions

- Further detailed analysis of variables including age, sex, comorbidities, prior antihypertensive medications, dose of radial antispasmodic cocktail, and sedation dose and their impact on periprocedural blood pressure changes may provide additional insight into risk factors that influence dosing of the anti-spasmodic cocktail.
- This study offers opportunities to open conversation regarding consolidation of anesthetic management between Neuro-interventional and Cardiac fields.

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