TEXAS MEDICAL ASSOCIATION

Physicians Caring for Texans

TexMed 2016 Quality Research Abstract

Please complete all of the following sections.

Procedure and Selection Criteria

- Applicants should demonstrate an understanding of systematic investigation through research development, testing and evaluation designed to develop or contribute to generalizable knowledge. Judges will use the scoring described in this matrix to identify projects to be presented at the conference, as well as, projects to be considered for the awards.
- These submissions should provide general information related to the one of the following categories: patient safety, patient centered care, equity, timeliness, efficiency, or effectiveness.
- Maximum points delineated with a brief explanation of the content that should be included under each section. Applicants may describe the problem and results in narrative or graphic format.

PROJECT NAME: Dating of a Throbus in Isolation when the Thromboendothelial Junction is not Available for Examination

Institution or Practice Name: Michael E DeBakey Veteran Affairs Medical Center, Baylor College of Medicine

Setting of Care: Hospital based practice

Primary Author: Christina Otterness, DO

Secondary Author: Daniel Rosen, MD

Other Members of Project Team: Click here to enter text.

Is the Primary Author, Secondary Author or Member of Project Team a TMA member (required)?

☒ Yes ☐ No

Please provide name(s): Christina Otterness

Project Category: *(Choose most appropriate category)*

☐ Patient Safety ☐ Patient Centered Care ☐ Timeliness

☐ Efficiency ☒ Effectiveness ☐ Equity

☐ **Enhanced Perioperative Recovery/Future of Surgical Care program**

For this poster session, TMA is looking for projects that demonstrate the six aspects of Quality Care as defined by the Institute of Medicine.

- Safe - avoids injuries to patients from care that is intended to help them
- Timely - reduces waits and delays for both those who receive care and those who give care
- Effective - based on scientific knowledge, extended to all likely to benefit, while avoiding underuse and overuse
- Equitable - provides consistent quality, without regard to personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status
- Efficient - avoids waste, including waste of equipment, supplies, ideas, and energy

- Patient centered - respects and responds to individual patient preferences, needs, and values, ensuring that patient values guide all clinical decisions

Quality Research

Introduction (15 points max): *Describe 1) where the work was completed; 2) what faculty/staff/patient groups were involved, and 3) sufficient background information provided to establish the significance of the problem.*

Dating of thrombi has been well described in forensic medicine where both the thrombi and throbendothelial junction are available for examination. Three phases have been described with phase I correlating to the 1st through 7th day, phase II, the second to eighth week, and phase III, older than 2 months (Fineschi, 2009). However, there is a paucity of literature describing how to date thrombi when only the thrombus and no thromboendotheial junction are available for examination. This circumstance is of particular clinical significant when a clot forms in a vascular conduit. In this situation, knowledge of vascular thrombus age is of significant clinical importance since it may predict its relative chronicity and the potential response to pharmaco-mechanical thrombectomy or catheter-directed thrombolysis (PMT/CDT) (Berridge 2002, Enden 2009). At the Michael E DeBakey Veteran Affaris Medical Center in Houston, TX, the pathology department received a request by the vascular surgeons to date the thrombus speciems that were submitted for histopathological analysis. There are no current published guidelines on how to accurately and reliably date thrombus specimens in isolation without the thromboendothelial junctions. Therrefore, a panel of immunohistochemical and special stains was selected by the pathologist receiving the cases to assist routine histopathological analysis in hopes of establishing a timeline of the formation of each individual specien.

Hypothesis (15 points max): *State the pertinent research or change hypothesis. Using if/then format, describe the 1) assumption; 2) condition; and 3) prediction(s).*

If we use a panel of special and immunohistochemical stains on thrombi with a known age from well documented clinical history, then we can extrapolate their staining patterns to thrombi of an unknown age and give the clinicians a reliable age of the thrombus in question.

Methods (25 points max): *Describe the specific methods, resources, procedures, models and/or programs used to study and test the subject of the investigation. Note charts, graphs and tables here and send as addendum with abstract form.*

Three cases of thrombus, that clinically were known to correspond to phase I, II and III where selected. Trichrome stain, elastin fibers stain, as well as immunohistochemical stains for desmin, smooth muscle antigen (SMA), CD34, and CD 68 were performed on the tissue. All special stains and immunohistochemical stains were performed in the Vetran Affairs Medical Center histology lab under routine laboratory protocals, and positive and negative controls were also performed. The slides were evaluated microscopically under 4x, 20x, and 40x magnification by the pathology resident and reviewed with the pathology attending. The staining patterns and intensity were documented.

Results (25 points max): *Specifically explain what was discovered, accomplished, collected and/or produced; supports hypothesis and conclusions with adequate evidence and includes quantitative data. Note charts, graphs and tables here and send as addendum with abstract form.*

The thrombus that clinically correlated with phase I showed rare macrophages, and negative staining for desmin and CD 34. The thrombus representing phase II had a moderate amount of macrophages within the fibrosis, and peripheral CD34 positive cells. The thrombus representing phase III had a paucity of macrophages, CD34 positive cells throughout the thrombus, and had well developed

desmin positive cells peripherally that were infiltrating into the central portion of the thrombus. Our hypothesis was supported as each thrmbi that clinically was know to correspond to a previously documented phase showed a unique staining pattern.
Please see Figure 1 and Table 1.

Conclusions (20 points max): *Provide a succinct interpretation of the results and evaluate what the results mean to the investigation, OR evaluate the relevance or uniqueness of what was accomplished in the immediate context of the project's purpose and describe how the investigation fits within a larger field.*

In this pilot study the use of immunohistochemical stains showed promising results in the advancement of dating thrombectomy specimens. Additional patient samples are actively being recruited, with the intention to extend this study, and gather further information regarding the immunohistochemical staining patterns of desmin, CD 34, and CD 68 as a way to differentiate the age of a thrombus in isolation when no thromboendothelial junction is available for examination. This will guide the clinician to make appropriate decisions regarding the best possible treatment of patients with an intravascular thrombus, particularly to determine if throbolytics may be attempted versus if a thrombectomy must be performed. This may lead to better patient outcomes and will allow utilization of resources more efficiently through reduced invasive procedures and more timely management of thrombi.

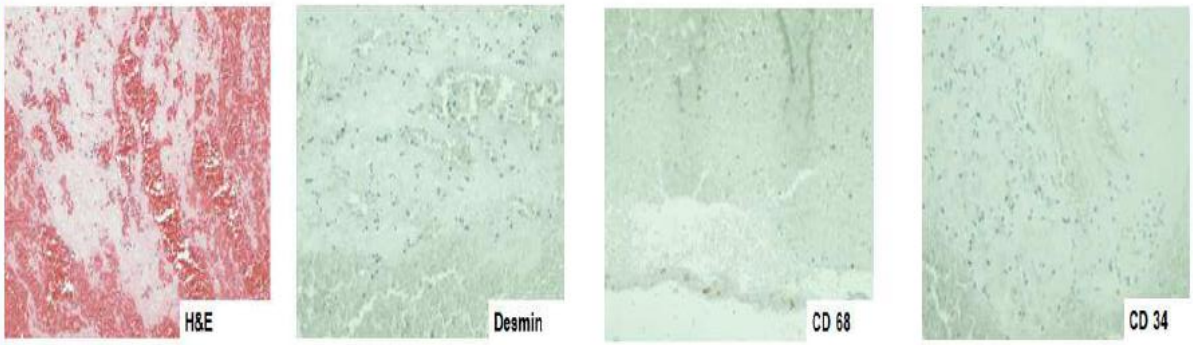
Table 1. Stains Used to Evaluate the Age of a Thrombus

	Phase I	Phase II	Phase III
Trichrome	non contributory	non contributory	non contributory
Elastin	non contributory	non contributory	non contributory
Desmin	Negative	+ (scattered cells)	++ (Peripheral positivity with central infiltration)
CD34	Negative	Peripheral positivity	Diffuse positivity
CD68	+ (Rare macrophages)	++ (Moderate infiltration of macrophages)	Negative (Macrophages not readily identified)

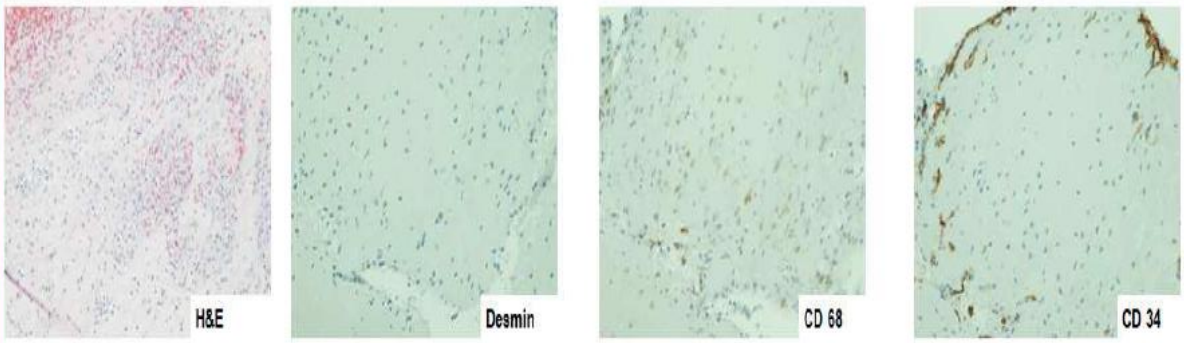
Phase I - up to 7 days after formation, Phase II - 2nd to 8th week after formation, Phase III – greater than 8 weeks after formation

Figure 1. immunostains used to evaluate the age of a thrombus (20x)

Phase I



Phase II



Phase III