Walter Reed National Military Medical Center

8th Annual National Capital Region Research Competitions

Bailey K. Ashford (BKA) Application Guide

History:

The Bailey K. Ashford Clinical Research Award (BKA) was established through the efforts of Colonel Marcel E. Conrad, the first Chief of Clinical Investigation at the Walter Reed Army Medical Center in Washington, DC. At his retirement in 1974, Dr. Conrad dedicated the award to Colonel Bailey K. Ashford, honoring Dr. Ashford's work during the early 1900s solving the problem of hookworm-induced anemia in Puerto Rico. The Department of Clinical Investigations added the laboratory component to the BKA Research Awards in 1996.

In 1996, the Army, Navy, and Air Force GME programs within the National Capitol Region began integrating, and any trainee who belonged to a program for which WRAMC was an active teaching center became eligible to compete for the awards. Following the 2011 BRAC integration of institutions within the JTF CapMed, the BKAs are presented annually to graduating trainees who have contributed the most significant research effort to the clinical or laboratory program during of training in GME program based in JTF CapMed Institutions.

Eligibility Requirements:

- All military physicians and dentists who are full-time trainees in a Graduate Medical Education (GME) program within the National Capital Region Medical Directorate.
- Complete the training program during the academic year of the award.
- Must not have previously received a BKA Award.
- Must be **nominated by his/her program director**.

Participation Event List:

- Abstract Submission Deadline: **07FEB2016**

The abstract submission package will be submitted to the Department of Research Programs Research and Innovation Month's email group: **"DHA NSA Bethesda WRNMMC Mailbox ResearchAndInnovationMonth,"** You will receive an email confirming that the package was received and a notification if any of your material is missing. You will have until the end of 14FEB2016 to have your package submitted with all of the required material.

Please complete and submit the following forms in your submission package to qualify for a review:

- ☐ Nomination Form (Page 4 – 5)
- ☐ Abstract Submission Form (Page 6)
- ☐ Abstract (Page 7)
- ☐ Applicant's Summative Achievement in Research Form (Page 8)
- ☐ Nominee's CV

- Poster Display Week: **You are required to display a research poster for Poster Display Week**

To notify the public about the amount of research conducted at the WRNMMC, all competition participants are required to display their research poster at Poster Display Week. Though it will not impact the participants' competition standing, **BKA applicants are required to display their research posters at this event**. The Medical Graphic Arts Department is able to create your research poster **for free**. Please submit a work order form and your poster to them by **01 March 2016**.

- Research Symposium I and II:

If you are notified that you are a competition category finalist in March – April, you will conduct a slide presentation of your submission at Research Symposium I and II. Each speaker will be given 15 minute time slots. Slide presentation will be 7-9 minutes, followed by a question-and-answer session. Awards will be given at the conclusion of Research Symposium II.

*****All forms and documents can be found in the 8th Annual Research Competitions folder located on the intranet (SharePoint), in the Education Training & Research Directorate, Department of Research Programs, in the Research Education Services under "2016 Research and Innovation Month."**

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Bailey K. Ashford (BKA)
Task Checklist

- Applicant starts on research project during his/her training period.
- Applicant completes the requested paperwork below for the BKA award.
- **First Submission**: Applicant submits abstract submission material to the Department of Research Programs Research and Innovation Month's email group at dha.bethesda.wrnmmc.mbx.researchandinnovationmonth@mail.mil with the subject line "Last Name, First Name (Category-Training Status-Category Type)" – Example: [White, Ben (BKA-Fellow/Staff-Clinical)] consisting of the following (Deadline: No later than **7FEB2016**):
    - Nomination Form (Page 4 – 5)
    - Abstract Submission Form (Page 6)
    - Abstract (Page 7)
    - Applicant's Summative Achievement in Research Form (Page 8)
    - Nominee's CV
- Applicant receives the status of their abstract submission package.
    - If the submission package is incomplete, the applicant may submit the missing material directly to the Research and Innovation Month's email group with the same subject line before 14FEB2016.
- **Second Submission:** Submit a poster draft, Medical Graphic Arts Department (MGAD) work order form, BUMED Instructions for Permission form and a HIPAA Privacy Release form to MGAD for its production. MGAD points of contact are Mary-Ann Ayrandjian (mary-ann.ayrandjian.civ@mail.mil) and Shane Stiefel (shane.m.stiefel.civ@mail.mil). (Deadline: **01 March 2016**).

NOTE: Please provide permissions for images/brands and any copyright information in poster submissions.

- Receive notification of whether applicant is a finalist for the BKA award category by email (March–April 2016) and start preparing a slide presentation for the Research Symposium I and II.
- Create and submit slide presentation, based on the research abstract, for Research Symposium I and II (Deadline: **01 May 2016**)
- Pick up poster from MGAD upon email announcement.
- Display research poster at Poster Display Week. **(09-13 May 2016)**
- Prepare formal uniform to present at Research Symposium I and II based on time slot assigned. **(18 & 19 May 2016)**
    - Army: Class A Uniforms
    - Navy: Dress Blue Uniforms
    - Air Force: Dress Service
    - Federal Employees/Contractors: Formal Business Attire
- Present for the awards ceremony at Research Symposium II. **(19 May 2016)**

Walter Reed National Military Medical Center

8th Annual National Capital Region Research Competitions

Bailey K. Ashford (BKA) Award
NOMINATION FORM

FROM: Program Director
Name, Rank and Title
Name of Program

TO: Chief, Department of Research Programs (WRNMMC)
SUBJECT: Nomination for the 8th Joint National Capital Region Research Competition
DATE:

I request that the following nominee be considered for the 8th Joint National Capital Region **Bailey K Ashford Award** for Medical Corps 2016 graduating trainees Research Competition in the category of (please highlight one):

Clinical OR Laboratory

Nominee Information:
Name, Title:

Company (USAE: Alpha Co, Bravo Co, or HHQ Co) OR Navy/AF

Project IRBNet number (if applicable)

Project time period

Duty assignment

Year of training

Email addresses

Primary

Secondary

Phone numbers

Daytime/Evening

Pager Number/Cell

Please CHECK that these documents are included in the email (incomplete submissions will not be reviewed):

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8th Annual National Capital Region Research Competitions

- ☐ Nominee's Curriculum Vitae is attached
- ☐ The Research Project abstract is attached
- ☐ Abstract Submission Form is attached (see below)
- ☐ BKA Nomination Form
- ☐ A one-page summary of the trainee's overall achievements during his/her training period

_____

SIGNATURE
DEPARTMENT HEAD/PROGRAM DIRECTOR

Walter Reed National Military Medical Center

8th Annual National Capital Region Research Competitions

Bailey K. Ashford (BKA) Award
ABSTRACT SUBMISSION FORM

Project Title

Author(s)
Name, Title, Department

Name, Title, Department

Name, Title, Department

Name, Title, Department

Name, Title, Department

Name, Title, Department

Bailey K Ashford Award for Medical Corps 2015 graduating trainees (please highlight one)

Clinical OR Laboratory

Walter Reed National Military Medical Center

8th Annual National Capital Region Research Competitions

Bailey K. Ashford (BKA) Award

ABSTRACT

ABSTRACT (One-page, Times New Roman, 12-point font)

OBJECTIVES

METHODS

RESULTS

CONCLUSIONS

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8th Annual National Capital Region Research Competitions

Bailey K Ashford (BKA) Award

APPLICANT'S SUMMATIVE ACHIEVEMENT IN RESEARCH

(One-page, Times New Roman, 12-point font)

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Bailey K. Ashford

Laboratory Abstract Submission Example

The following is an abstract submitted by last year's BKA Laboratory Winner.

OBJECTIVES: Heterotopic ossification (HO), the ectopic formation of mature lamellar bone in nonosseous tissue, occurs following traumatic combat injuries, including traumatic amputations, in nearly two-thirds of patients. Up to 40% of patients with HO require surgical resection. Though means of primary prophylaxis exist, they are contraindicated, impractical and/or unproven in the combat casualty care setting. As such, a considerable amount of effort has been directed towards developing novel means of primary prophylaxis and treatment. However, there is currently no existing animal model for combat-related HO that recapitulates the systemic and local inflammatory response observed in combat trauma. We sought to (1) reproduce the phenotype of combat-related HO in a rat, by emulating patterns of injury seen in patients with severe extremity injuries resulting from explosive blasts, to create a preclinical small animal model of combat related HO in order to address mechanistic questions that are difficult to address with clinical studies and evaluate novel therapeutic approaches and (2) determine if the presence of bioburden (Acinetobacter baumannii (AB) and methicillin-resistant Staphylococcus aureus (MRSA)) impacts the magnitude of HO formation.

METHODS: Adult male Sprague Dawley rats underwent a combination of one or more insults to recreate the following: (1) systemic inflammation induced by blast overpressure (BOP), (2) extremity trauma by creating an open femur fracture with a soft tissue crush injury, and (3) amputation (AMP) or fracture fixation (FX). The BOP was delivered at 120 +/- 7 kPa, the open femur fracture was created from a 500g drop weight apparatus, and the crush injury from compression clamps at 20psi for 1 minute over the fracture site. After the injury, the rats underwent transfemoral amputation or fracture fixation using a kirschner wire. The presence of HO was evaluated using radiographs, micro-CT and histology. Once the model was established, we used the above model and inoculated the wounds beneath the myodesis with MRSA or AB.

RESULTS: Seventy-four rats were randomized into five groups: 10 BOP-CTL, 10 FX-CTL, 10 AMP-CTL, 23 BOP-FX, and 21 BOP-AMP. Twelve rats were euthanized early and the 62 remaining rats were included for statistical analysis. The first radiographic signs of HO occurred between two and four weeks post-operatively. HO did not develop in the BOP-CTL nor the FX-CTL groups. HO developed in 7 of 16 BOP-FX, 6 of 9 AMP-CTL, and in all 20 BOP-AMP animals. The addition of BOP resulted in significantly higher prevalence of HO, when comparing the AMP-CTL and BOP-AMP groups ($p=0.007$). Histologic analysis demonstrated evidence of chondrocyte hypertrophy, cartilage vascularization and early mineralization of the cartilage noted in BOP-AMP injured animals by 14 days post injury, whereas histopathologic assessment at 24-weeks post-injury revealed minimal periosteal new bone formation in BOP-CTL animals. In experiment two, 48 additional rats underwent BOP-AMP then either remained a control (n=8) or were inoculated with MRSA (n=20) or AB (n=20). At 12 weeks, we observed more severe HO in rats infected with MRSA compared to AB ($p<0.001$) and control ($p<0.001$).

CONCLUSIONS: We successfully developed a model for blast-related HO in a rat by recreating a relevant combat- injury pattern using a series of precise, reproducible interventions. Blast over pressure in the presence of extremity trauma as described produced radiographically evident HO in the majority of rats. The BOP-AMP group demonstrated HO in all surviving animals with acceptable mortality, and HO severity increased with the addition of MRSA, but not AB. Future studies may use the BOP-AMP-MRSA model to investigate early cellular and molecular pathways, test the effects of various intensities of BOP, and evaluate novel means of primary prophylaxis and treatment currently in development.

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Clinical Abstract Submission Example

The following is an abstract submitted from last year's BKA Clinical Winner:

ABSTRACT (One-page, Times New Roman, 12-point font)

Title:

Feasibility of Intercostal Artery Doppler Ultrasound Exam Prior to Thoracentesis

Objective

Thoracentesis is performed at least 200,000 times annually in the United States. Hemorrhagic complications occur in up to 2% of thoracenteses; many result from intercostal artery injury. A growing body of cadaver and radiographic research indicates the traditional landmarks-based approach to avoiding intercostal arteries is dangerously inadequate. Tortuous or accessory intercostal arteries may course far from the protection of the accompanying rib. Small series and anecdotal experience indicate the intercostal arteries can be visualized with ultrasound.
We undertook this prospective pilot study to determine the feasibility of routinely performing a Doppler arterial exam prior to thoracentesis.

Methods

20 adult patients with pleural effusions requiring thoracentesis were enrolled in this prospective observational study. Physicians performing thoracentesis identified and marked a planned needle entry site using phased-array ultrasound. Investigators examined the ipsilateral hemithorax with a high-frequency linear ultrasound probe using color Doppler to identify the intercostal arteries. Distance between artery and rib at the marked site was noted. Time to complete routine and arterial ultrasound examinations and the procedure in total were recorded. Physicians and patients were surveyed to determine the perceived burden of the additional exam and effects on perceived safety.

Results

The intercostal arteries were identified in 14 of 20 patients (70%) and 13 of 14 nonobese patients (93%). The artery was noted directly in the proposed needle path once (5%) and was near the proposed site once (5%). The mean time to perform the study exam was 1:59 minutes (SD 1:07), while routine exam took 4:18 minutes (SD 2:29). The procedure in total took 25:12 minutes (SD 7:22). Physicians noted minimal perceived burden, scoring 4.75 (SD 0.55) on an anchored Likert-like scale from 1 (significant burden) to 5 (no burden). An increase in the perceived safety of the procedure was noted both among physicians ($p<0.001$) and patients ($p=0.012$).

Conclusions

The intercostal arteries can be identified with color Doppler ultrasound in most patients undergoing thoracentesis. The time and perceived burden associated with the additional exam is minimal; it is feasible for research and routine practice. The exam increases perceptions of safety and in some instances may avert arterial injury. Further prospective study powered to detect a difference in outcomes is required to demonstrate an actual effect on safety.

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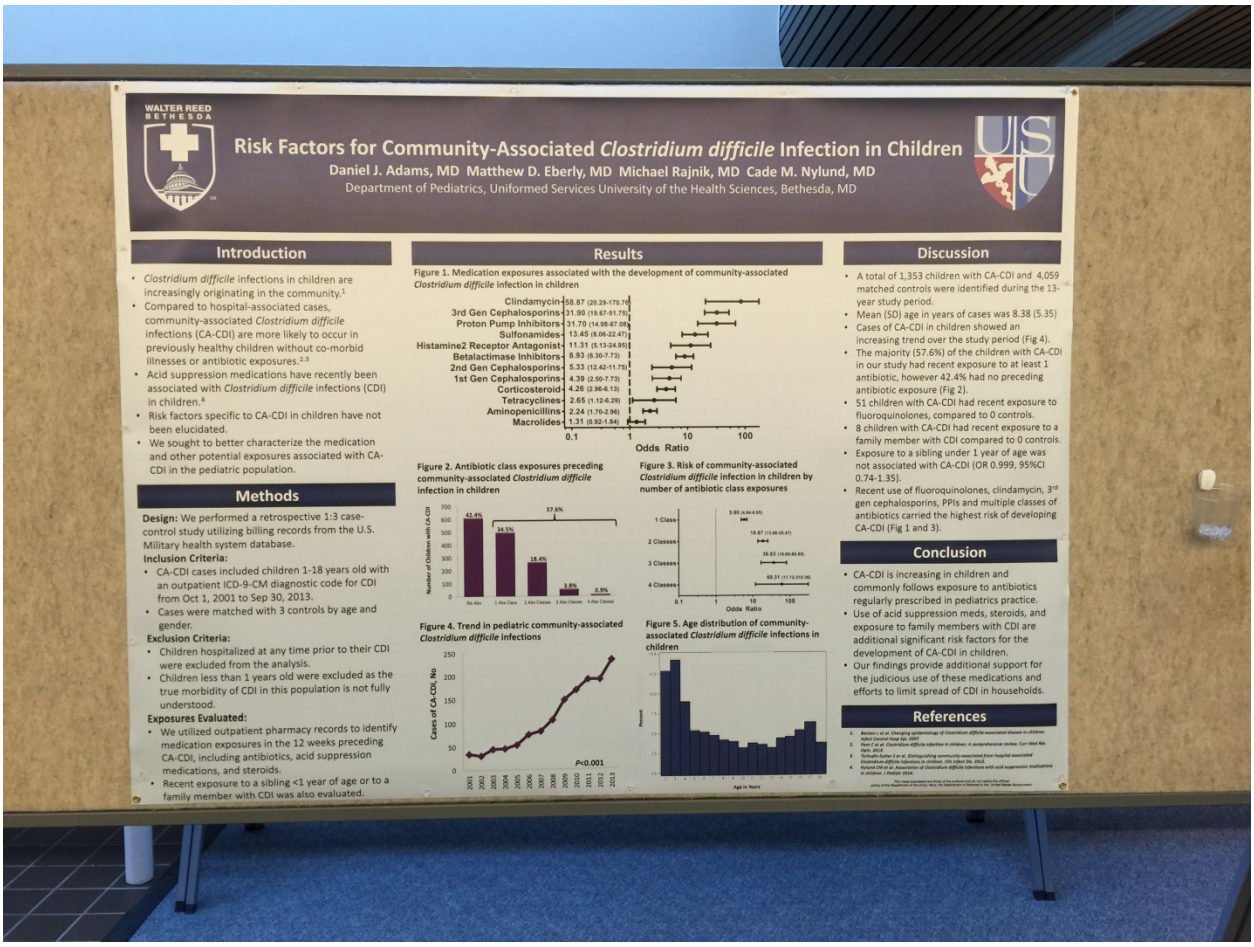
Poster Guide:

While BKA applicants are given freedom to choose the content and arrangement of their posters. Research posters should have the following subjects included:

Title
Introduction and/or Objectives
Methods
Data/Results
Discussion
Conclusion
References

Here is an example of a poster submitted from the 2015 Poster Display Week:



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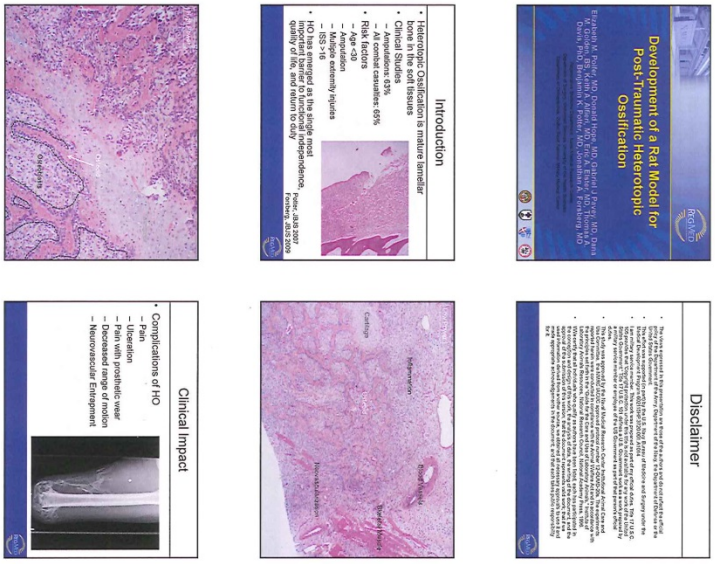
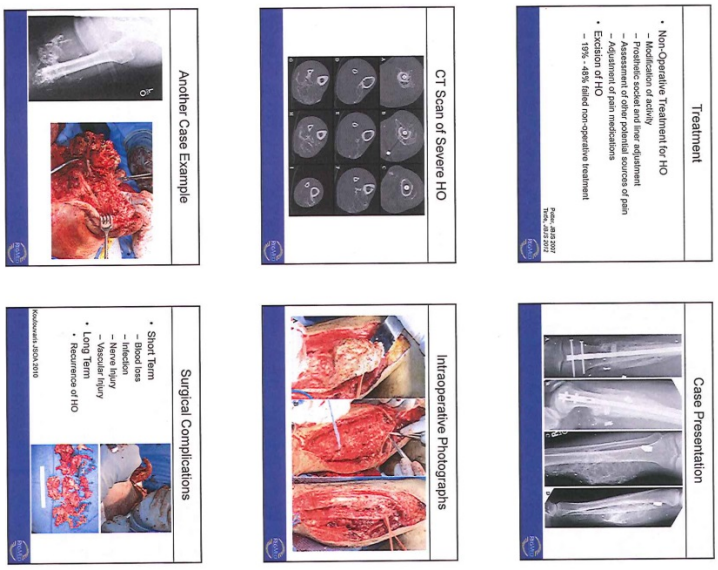
Slide Presentation:

Slide presentation should be presented in a manner similar to how the research poster was presented. Slides should follow the same presentation order as the research posters. However, applicants may decide the content shown and in what manner for each presentation. Text should be legible for the audience to read.



9/17/2015

1



9/17/2015

2

9/17/2015

Current Prophylaxis

- Radiation therapy
  - Wound related complications
- NSAIDs
  - Delays in bone healing
  - Platelet dysfunction
  - GI complications

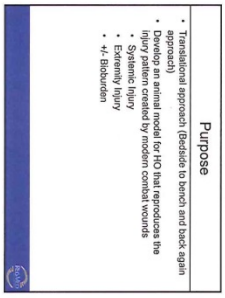
Logistically infeasible

Modifiably contraindicated in polytrauma

Pedler, JBJS 2007
Tarchi, JBJS 2012

Injury Cycle

Inflammatory Response



Purpose

- Translational approach (Bedside to bench and back again approach)
- Develop an animal model for HO that reproduces the injury pattern created by modern combat wounds
  - Systemic Injury
  - Extremity Injury
  - +/- Biofoulden

Design

- System
  - Blast
- Extrem
  - Crush
  - Ampu
- +/- Biofo
  - MRSA
  - Acine

Design

Group	Wound	Systemic Treatment	Biofoulds
2A	Fracture + crush + amputation	Blast	None
2B	Fracture + crush + amputation	Blast	MRSA
2C	Fracture + crush + amputation	Blast	A. Baumanii

Design

Group	Wound	Systemic Treatment
1A	Mono-Repair Control	Blast
1B	Fracture Control	None
1C	Fracture + crush + IM Fix + amputation	None
1D	Fracture + crush + amputation	Blast
1E	Fracture + crush + IM Fix	Blast
	Fracture + crush + amputation	Blast

Existing Models

- Artificial
  - BMP Implantation Model (mice, rabbits)
- Local Injury
  - Hip Arthroplasty Model (Rabbit)
  - Immobilization Manipulation Model (Rabbit)
  - Injection of Irritants (Rabbit)
  - Achilles Tenotomy Model
  - Explosive Amputation Model
- Local and Systemic Injury
  - None

Wise, BMC 2007
Mills, Science 1995
Kaplan, JBJS 1983
Nicholas, JBJS 1983
Herndon, JBJS 1949

Design

Blast Waveform: Energetic Material

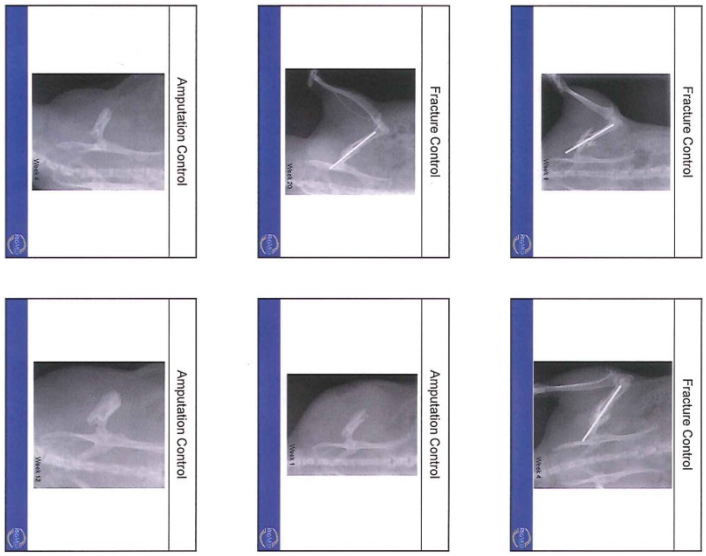
Blast Control

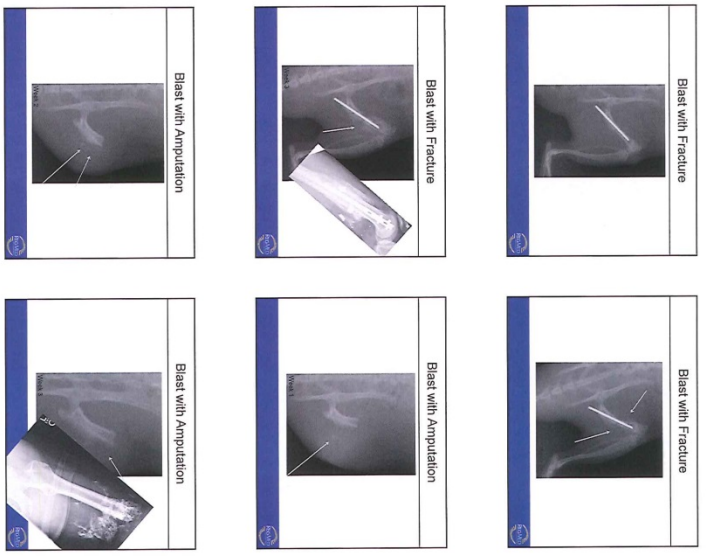
Blast Control

Blast Control

3

4


Fracture Control
Week 4
Fracture Control
Week 4
Fracture Control
Week 6.5
Amputation Control
Week 1
Amputation Control
Week 6.5
Amputation Control
Week 6.5


Blast with Fracture
Blast with Fracture
Blast with Fracture
Blast with Amputation
Blast with Amputation
Blast with Amputation

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CT Results

CT Results

Results

Treatment Group	Number in the Group	Early Calcification	HO Formation
Blast Control	10	1	0
Fracture Control	10	1	0
Amputation Control	10	1	0
Fracture with Blast	23	7	6
Amputation with Blast	21	1	20

Results

- Heterotopic ossification developed in ALL of the AMP – BOP animals
- The addition of BOP resulted in significantly higher prevalence of HO, when comparing the AMP-CTL and AMP-BOP groups (p=0.007)

Results

Treatment Group	Number in the Group	Early calcification	HO formation
Bacteria Control	8	0	18.3mm/± 3.2
MRSA	20	6	64.5mm/± 8.6
A. Baumannii	20	4	29.5mm/± 3.7

Results

- Volumetric measurements of ectopic bone formation was more robust in animals inoculated with MRSA
  - *A. baumannii* (p < 0.001)
  - Vehicle control (p < 0.001).
- Comparison of vehicle control and *A. baumannii* inoculated groups showed no significant difference (p= 0.43)

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9/17/2015

Conclusions

- Consistently produced HO in the animals
- BOP + Extremity Amputation = HO
- BOP + Extremity Amputation + Presence of MRSA = HO
- Limitations
  - Consistency
  - Rat Model

Implications / Future Directions

- We have a working model!
- Future studies to investigate early cellular and molecular pathways
- Evaluate interventions which mitigate wound contamination and inflammation
- Evaluate novel means of prophylaxis currently in development
- Evaluate novel means of evaluation

Acknowledgements

WRNMC Research Institute Grants
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-Mark Gaspar, MD
-Mark Gaspar, MD
-Mark Gaspar