tional management (NIM). We hypothesize that there will be a significant difference between the rate of infections dependent on management pathway.

Materials: We conducted a retrospective review of all 1,101 splenic injuries at our institution from 2005 to 2010. Criteria for inclusion included age greater than 6, documented visit within our health system more than 30 days from injury, and a completed dataset. Infections, as determined by ICD9 code, were included if they occurred more than 5 days from the injury and was related to encapsulated bacteria, other bacterial infection, bacterial syndrome (e.g., pneumonia), or systemic inflammatory response syndrome. Groups were compared by a binary logistic regression analysis that included splenic injury grade, injury severity scale (ISS), Glasgow Coma Scale (GCS) at presentation, and age at the time of injury to control for potential confounders.

Results: Six hundred thirty seven cases were included in the final analysis. Infection rates for splenectomy and IR were similar at 28.5% and 27.5%, respectively, and both significantly higher than NIM at 10.8% (OR = 2.51, 95% CI 1.38–4.59 and OR = 2.70, 95% CI 1.25–5.79). Multivariate logistic regression demonstrated management pathway ($p = 0.004$), age ($p = 0.024$), ISS ($p = 0.004$), and GCS ($p < 0.001$) as independent predictors for infection.

Conclusions: Management pathway is an independent predictor for future infections with both splenectomy and IR having a higher rate of infection compared to NIM when controlling for potential confounders. Vaccination may be indicated in IR patients after embolization.

4:05 PM **Abstract No. 155**

Validation of a predictive model for platelet increase following partial splenic artery embolization in cancer patients with thrombocytopenia

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Purpose: To train and validate a predictive model of platelet increase following partial splenic artery embolization (PSAE) in cancer patients with thrombocytopenia. Additionally, to evaluate the accuracy of intra-procedural angiographic assessments of splenic embolization volume with the gold standard of post-procedural cross-sectional volumetric measurements.

Materials: A single-institution , IRB-approved retrospective review of all PSAEs for thrombocytopenia between 2008 and 2015 was performed. Patients with CT imaging within 60 days prior to the procedure and within 1 year following the procedure were included. Pearson's correlation was used to assess for the relationship between the volume of embolized splenic tissue as estimated by the performing interventionalist by angiography and the volume of embolization as measured from CT images using a commercial software package (TeraRecon). Next, a predictive model for post-procedure platelet increase based upon demographic (age, gender, pre-procedure platelet value, pre-procedure splenic volume) and procedural (proximal versus distal embolization, splenic volume embolized by CT volumetry) variables was created using multivariate stepwise logistic regression. The model was internally validated using split-half cross-validation.

Results: A total of 164 patients underwent PSAE, most commonly (95%) with Gelfoam mixed with gentamicin 80mg. Of these patients, 87 patients met all inclusion criteria and were included in this study. Linear correlation between intra-procedural angiographic assessments and CT-based volumetric assessments of embolized splenic volume was poor ($r = 0.08$, $P = 0.45$), with angiographic assessments typically overestimating the embolized volume. Percent splenic volume embolized was the strongest predictor of platelet response (OR 2.8, 95% CI: 1.4–5.8). The predictive model was highly significant ($P = 0.009$) and correlated well with actual data ($r = 0.75$, $P < 0.001$).

Conclusions: A model based on percent splenic volume embolized predicts platelet response following PSAE for thrombocytopenia. Angiographic assessments of splenic embolization volume are inaccurate, suggesting the added utility of cross-sectional tools such as cone-beam CT during PSAE.

4:14 PM **Abstract No. 156**

Efficacy and safety of partial splenic embolization in patients with splenomegaly associated cytopenias

B. Dubois[1], C. Wilcox[2], J. Weintraub[3], J. Susman[4], D. Sperling[5], V. Sheynzon[6], P. Schlossberg[6], S. Chheang[6], S. Reis[7], D. Mobley[8]; [1]Columbia University College of Physicians and Surgeons, New York, NY; [2]New York Presbyterian/Columbia, New York City, NY; [3]N/A, Scarsdale, NY; [4]New York Presbyterian/Columbia, New York, NY; [5]N/A, Montebello, NY; [6]N/A, New York, NY; [7]Columbia University, New York, NY; [8]N/A, Brooklyn, NY

Purpose: To investigate the impact of partial splenic embolization (PSE) on three key hematological indices: hemoglobin, white blood cell (WBC) count, and platelet count. To determine the time over which the effect persists out to 5 years, and the rate of major complications associated with the intervention in the non-emergent setting.

Materials: This is a single-center retrospective study evaluating 102 patients who underwent PSE between January 2000 and May 2016. Inclusion criteria consisted of splenomegaly confirmed by imaging and at least one of the following associated cytopenias: hemoglobin less than 10 g/dL, WBC count less than 1,500 uL-1, and/or platelet count less than 100,000 uL-1. Patients with cytopenias related to alternative etiologies were excluded, as were patients who underwent PSE primarily for the treatment of recurrent variceal hemorrhage.

Results: 38 of 102 patients met criteria, for a total of 40 PSEs. Mean laboratory follow up time was 1.5 years. No significant effect was seen on median hemoglobin values beyond 2 weeks post PSE. There was a significant and sustained increase in both median WBC counts (from 3,400 uL-1 at baseline to 4,900 uL-1 at 1.5 years) and platelet count (from 65,000 uL-1 to 124,000 uL-1) out to 1.5 years. Median platelet count was persistently elevated, though not significant, in the 3 patients followed out to 5 years. The intervention had no significant impact on MELD-Na or Child-Pugh (CP) score. In 6 out of 40 PSEs (15%) a serious complication resulted, which included pleural effusion, ascites, spontaneous bacterial peritonitis, pneumonia, and inferior vena cava thrombus requiring surgical intervention.
Conclusions: PSE is efficacious in increasing WBC and platelet counts out to 1.5 years in patients with splenomegaly associated cytopenias. Platelet counts likely remain elevated as far out as 3 years. With regard to safety, PSE has minimal impact on prognostic factors for chronic liver disease, which is a common cause of hypersplenism. However, the intervention is associated with a significant complication rate and special care should be taken when selecting patients for PSE, as they frequently have multiple comorbidities.

Scientific Session 17

IO: Biopsy

Monday, March 6, 2017
3:00 PM – 4:30 PM
Room: 150A

3:00 PM **Abstract No. 157**

Utility of routine tract embolization for percutaneous liver biopsy

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Purpose: Tract embolization for percutaneous liver biopsy is performed to decrease the risk of bleeding complications. The purpose of this study is to investigate the utility and costs of routine tract embolization in everyday practice.
Materials: A total of 245 percutaneous liver biopsies performed by interventional radiology from January 2013 to October 2015 were reviewed. The study included 108 (44%) males and 137 (56%) females with mean age of 62 (range 19-94). Tract embolization was performed in 88 (36%) of the patients. Gelfoam sponge (51%; Pfizer), D-stat flowable (40%; Vascular Solutions), Gel-Block pledgets (8%; Vascular Solutions), and Avitene Hemostat (1%; Bard Davol) were utilized for tract embolization. Complications were characterized as major (bleeding requiring transfusion) or minor (all else).
Results: There was no statistical difference in average preprocedural INR (1.1) and platelet count (258) between the tract embolization and non-tract embolization groups. 231 (94%) of the patients were considered low risk for bleeding (INR < 1.5, platelets $> 50{,}000$); all observed complications were in this group of patients. There were a total of 6 complications, resulting in a 2.4% complication rate. No major complications were detected and all bleeding related complications ($n = 3$) were considered minor. Minor complications included severe abdominal pain without detectable etiology on CT ($n = 2$), bilious drainage from biopsy site ($n = 1$), persistent oozing from dermatotomy site ($n = 1$), and small perihepatic hematoma ($n = 2$). There was no statistical difference in complication rates ($p = 0.4$) or bleeding related complications ($p = 0.1$) between the tract embolization and non-tract embolization groups. The costs of embolics per procedure were \$19.06 (Gelfoam sponge), \$59 (Gel-Block pledgets), \$77.31 (Avitene Hemostat), and \$118 (D-stat flowable). On average, tract embolization resulted in an additional cost of \$62.25 per procedure.
Conclusions: Routine tract embolization may not be indicated in patients at low risk for bleeding during percutaneous liver biopsy and results in additional costs. Studies with larger enrollment will be needed to assess for major bleeding complications.

3:09 PM **Abstract No. 158**

Technical success rates of contrast-enhanced ultrasound-guided biopsy of hepatic lesions

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Purpose: To evaluate technical success of contrast-enhanced ultrasound (CEUS)-guided biopsy of hepatic lesions, using Definity and Lumason as contrast agents.
Materials: An IRB-approved retrospective study from January 2015 to August 2016 was performed on patients status-post CEUS-guided liver lesion biopsy secondary to suboptimal visualization on B-mode ultrasound. A total of 18 patients underwent biopsy with CEUS guidance as an alternative to CT guidance, which is current clinical practice for biopsy of inadequately visualized liver lesions by conventional ultrasound. Four of 18 patients (22%) had cirrhosis. All procedures were performed under moderate conscious sedation except for two cases which required general anesthesia with Propofol. As contrast agent, Definity (Lantheus Inc.) was given in 15 patients, and Lumason was given (Bracco S.p.A) in 3 patients. Technical success was defined as sufficient tissue sample demonstrating concordance between histopathology and imaging, thus providing definitive diagnosis without need for re-biopsy. Lesion location, size, contrast amount, procedure time, complications, and final histopathology were recorded for each individual.
Results: Technical success was achieved in 15 of 18 patients (83.3%), including all 4 patients with cirrhosis. Procedure time was 30 ± 12 min. No peri-procedural complications were noted. Definity doses ranged from 0.5 to 1.5 mL, producing conclusive histopathology diagnoses in 12 of 15 patients (80%). Lumason was dosed at 4.8 mL in 3 patients with 100%