

CONCLUSION: These results demonstrate that L-UAE with non-spherical PVA is effective and compares well with complete UA embolization. L-UAE is associated with significantly less pain and morphine uptake.

12:52 PM

Abstract No. 86

Comparison of Tris-acryl Gelatin Microspheres and Polyvinyl Alcohol for Uterine Fibroid Embolization.

F.P. Lan, St. Michael's Hospital, Toronto, ON, Canada • R.P. Chan • E. David • A.A. Common

PURPOSE: Uterine artery embolization (UAE) is becoming increasingly accepted as a treatment for symptomatic fibroids. Traditionally, the embolic agent most commonly used has been polyvinyl alcohol (PVA). Tris-acryl gelatin microspheres (TAGM) have also been used; however no direct comparison of these two agents has been performed. The purpose of this study was to compare the safety and efficacy of PVA and TAGM for UAE for symptomatic fibroids.

MATERIALS AND METHODS: One hundred UAE candidates with symptomatic fibroids were randomized to receive either PVA or TAGM for UAE. Baseline pelvic ultrasounds were compared with 3 month post-embolization studies to assess uterine and dominant fibroid volume reduction. Post-embolization questionnaires were used to assess for symptomatic improvement.

RESULTS: Of the 100 patients, technical success was achieved in 99. The mean number of vials used per procedure was 3.2 for PVA compared to 5.7 for TAGM. Three month ultrasound data are currently available in 60 patients (30 PVA, 30 TAGM). The mean reduction in total uterine volume was 32.3% for PVA and 27.3% for TAGM ($p=0.37$). The mean reduction in dominant fibroid volume was 50.0% for PVA and 56.7% for TAGM ($p=0.36$). Sixty-five patients (29 PVA, 36 TAGM) completed the postembolization questionnaires. Symptomatic improvement was reported for menorrhagia (25/29 [86.2%] for PVA and 24/32 [75.0%] for TAGM), pain (18/24 [75.0%] for PVA and 20/25 [80.0%] for TAGM), and bulk (20/23 [86.9%] for PVA and 22/30 [73.4%] for TAGM). Time to symptomatic improvement was less than one month in 13/29 (44.8%) of PVA patients and between one to two months in 11/36 (30.6%) of TAGM patients. Overall, 25/28 (89.3%) of PVA patients and 32/36 (88.8%) of TAGM patients were satisfied with their clinical results.

CONCLUSION: UAE with PVA and TAGM results in similar early uterine and dominant fibroid volume reduction, as well as similar symptomatic improvement. There was a tendency to using more embolic material when UAE was performed with TAGM compared with PVA.

1:03 PM

Abstract No. 87

The Effectiveness of UFE Performed with PVA-Microspheres at Improving Symptom Severity and Quality of Life.

G.P. Siskin, Albany Medical Center, Albany, NY, USA • S. Misra • S. Tucker • M. Englander

PURPOSE: To evaluate the effectiveness of polyvinyl alcohol (PVA) microspheres at improving symptom severity and health related quality of life in patients undergoing uterine fibroid embolization (UFE).

MATERIALS AND METHODS: A retrospective review of patients undergoing UFE at our institution during an 11 month period was performed. The study population consisted of 112 patients (mean age = 46 years; range = 35-56 years) who

underwent UFE using 500-700 μ m PVA microspheres (Contour SE Microspheres, Boston Scientific Corporation, Natick, MA) as the embolic agent. Clinical assessment was obtained using The Uterine Fibroid Symptoms and Health Related Quality of Life Questionnaire (UFS-QOL), which was administered to patients prior to UFE and at the time of clinical follow-up (≥ 3 months after UFE); 80 patients (71%) were eligible to complete a post-procedure questionnaire. 53 patients (47%) were eligible for 6-month imaging follow-up with MRI.

RESULTS: The dominant presenting symptoms included abnormal bleeding (48.8%), pelvic pain (13.8%), and bulk-related symptoms (21.3%); the remaining patients reported multiple dominant symptoms. The mean uterine volume prior to UFE was 552.2 cm³ and the mean dominant fibroid volume was 189.9 cm³. A mean of 6.8 mg of PVA microspheres (range 2-20 mg) was utilized during these procedures. 47 patients completed pre and post-UFE questionnaires, which was 59% of those eligible. In these patients, the mean transformed symptom severity score decreased from 0.531 to 0.133 ($p<0.05$). The mean HRQL score increased from 0.538 to 0.905 ($p<0.05$). 6-month imaging follow-up was available in 30 patients, which was 57% of those eligible. In this group of patients, there were significant decreases in mean uterine and dominant fibroid volume ($p<0.05$) with a mean uterine volume reduction of 36.4% and a mean dominant fibroid volume reduction of 60.9%. Two patients reported a self-limited rash within 2 weeks of the procedure.

CONCLUSION: UFE performed with PVA microspheres is safe and effective, resulting in significant improvements in symptom severity and health related quality of life in addition to significant volume reductions in both the uterus and dominant fibroid.

**Scientific Session 17
Practice Management**

Saturday, March 27, 2004

12:30 PM - 2:00 PM

*Moderator(s): Rodney D. Raabe, MD
Michael C. Soulen, MD*

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Abstract No. 88

The Impact of a Computerized Patient Scheduling and Tracking System on a Large Interventional Radiology Practice.

R.I. Chen, Northwestern Memorial Hospital, Chicago, IL, USA • S. Shah • K.T. Sato • A.A. Nemcek • R.L. Vogelzang • S.A. Resnick

PURPOSE: To assess the progress of scheduling changes made in an effort to improve patient access to a large volume (>12,000 cases/year) academic IR practice, while maintaining or improving patient and staff satisfaction levels.

MATERIALS AND METHODS: A time-methods analysis was made of patient throughput for all IR procedures starting in October 2002 until the present. Changes in time parameters for the various IR procedures were implemented in March 2003 based on average length of procedure, staff/room limitations, and room turnaround times. Emergent/urgent case time blocks were reserved into daily schedules for a projected number of add-on cases based on the data analysis. Patient satisfaction and staff satisfaction was measured by written survey before and after the implemented schedule changes.

RESULTS: Analysis of the collected data demonstrated that for a majority of sampled procedures, insufficient time was scheduled to allow for the average length of a given procedure, including room turnaround time. This led to delays in future procedure start times, which resulted in patient dissatisfaction, as well as staff dissatisfaction. By written survey, patient satisfaction with their waiting for a procedure prior to scheduling changes increased from 57%, to 75% afterwards. Overall staff satisfaction for technologists and nurses was increased by 16%.

CONCLUSION: Time-methods data collection of IR procedures performed in our practice revealed the need to make adjustments to the currently allotted time blocks, as well as allow flexibility for add-on cases, to reflect the true amount of time/human resources available. Although many variables and potential flaws in the data collection exist, we believe that the implementation of the scheduling changes has led to significantly improved patient and staff satisfaction.

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Abstract No. 89

The Economic Return of a Legs for Life® Screening Campaign.

J.A. Solomon, Hospital of the University of Pennsylvania, Philadelphia, PA, USA • A. Patel • S. Stavropoulos • J. Mondschein • T. Clark • C. Tuite

PURPOSE: To determine the economic impact of a Legs for Life screening event on a Radiology department.

MATERIALS AND METHODS: Patients completed a risk factor questionnaire and had ankle-brachial indexes (ABIs) calculated. Patients with significant risk factors underwent screening for abdominal aortic aneurysm and/or carotid disease. Carotid screening was based on the internal to external carotid artery systolic velocity ratio. Participants consulted with an interventional radiologist to discuss the results of the screening. For peripheral vascular disease, risk was based on ABIs and history. Risk of carotid disease requiring follow up was based on a systolic velocity ratio greater than 2.5. An aorta with a diameter greater than 2.5 cm was considered aneurysmal. The interventional radiologist formulated a follow up plan. When additional tests were recommended, patients were given the option of scheduling the examination in conjunction with a follow up appointment in the interventional radiology clinic. When indicated, primary care physicians were contacted during the screening to discuss the plan and obtain a referral. If the patient preferred to follow up with their primary care physician, letters suggesting a diagnostic plan were dispatched and close telephone follow-up performed. The resulting examinations and consultations performed in the radiology department were tracked. Professional compensation was tallied based on 2003 Medicare reimbursement rates.

RESULTS: 197 patients were screened. 30 had ABIs and clinical histories prompting further studies. 26 people underwent an abdominal ultrasound. A 5 cm aneurysm was identified. 27 carotid ultrasounds were performed, three patients met criteria for additional studies. At the time of abstract preparation 14 studies had been performed (7 MRIs, 4 PVR exams, 1 CTA, and two angiograms with interventions). There had been five office visits to interventional radiologists. 391.73 RVUs were generated, corresponding to \$14,410.02 in professional revenue. Six month follow up data will be presented.

CONCLUSION: The Legs for Life screening program may benefit a radiology department if an appropriate population is screened and compliance is high.

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Abstract No. 90

The Economic Impact on a General Radiology Group from Establishing a Dedicated Interventional Radiology Service.

M.J. Sichlau, Decatur Memorial Hospital, Decatur, IL, USA • R.K. Ryu • J. Locke

PURPOSE: Implementing a dedicated Interventional Radiology (IR) practice yields undeniable benefits to patient care. However, the economic impact on a general radiology practice has not been closely evaluated. We sought to evaluate the direct economic effect that an IR service has on total radiology billing, as well as the indirect economic effect from additional diagnostic radiology studies generated by IR services.

MATERIALS AND METHODS: IR coding and billing data were collected in a prospective manner for a practice site of 2 dedicated full time interventional radiologists. Over the first 12 months of establishing a dedicated IR service, Relative Value Units (RVU's) were tabulated for all interventional services performed. Subsequently, RVUs from additional diagnostic studies performed as a direct result of IR services were tracked. Total billing for the radiology group was tracked for the 3 years prior to implementing a dedicated IR service, as well as for the first year of IR service.

RESULTS: For a 12 month period, 10095.45 RVUs were generated by IR billing. In addition, 446.93 RVUs were generated from diagnostic studies resulting from IR services. The greatest number of RVUs generated were from follow-up abdominal CT examinations, yielding 106.35 additional RVUs. IR billing accounted for 16% of total radiology group billing. Total billing for the radiology group grew by an average of 14% per year during the 3 years prior to implementing a dedicated IR service. Billing grew by 35% in the first year of having a dedicated IR service.

CONCLUSION: The economic impact of a dedicated IR service on our radiology group was significant, even in its first year of implementation. The economic benefit extended beyond IR billing and generation of additional diagnostic studies that would otherwise not have been performed.

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Abstract No. 91

Prospective Evaluation of Imaging and Interventional Procedures Generated by an Outpatient IR Office.

J.K. McGraw, Riverside Methodist Hospital, Columbus, OH, USA • B. Fricke • J.A. Lippert • L.M. Dean • E. Dolen • T.M. Davis

PURPOSE: In considering the true value of an outpatient IR office, one must look beyond evaluation and management charges. The purpose of our study is to analyze the imaging and interventional procedures generated by an outpatient IR office.

MATERIALS AND METHODS: Setting: An outpatient IR office (open 3.5 days per week) with five IR and two INR physicians. Data Collection: Prospective data collection of each patient encounter, imaging and interventional procedure performed.

RESULTS: Over a six month period there were 714 patient encounters (369 new pts. and 345 follow-up pts.). 512 imaging studies were ordered (223 ultrasounds, 199 MRI, 64 CT, 20 nuclear medicine, and 6 plain film studies). 731 procedures were generated from the patient encounters (284 spine interventions (vertebroplasty, ESI, IDET, etc.), 149 embolizations (laser vein ablation, UFE, chemoembo, neuro, etc.), 131 angiograms, 65 venous sclerotherapies, 65

venograms, 26 PTA/stent, and 11 other. There was an average of 1.02 procedures per patient encounter and 0.72 imaging procedure per patient encounter generated by the office practice.

CONCLUSION: Establishing an outpatient interventional radiology office can generate many additional imaging and interventional procedures that may not have been performed in a hospital based practice. In deciding whether to open an outpatient office, it is important to look beyond evaluation and management charges and consider everything that the outpatient office can generate.

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Abstract No. 92

Hepatic Chemoembolization: The Value of a Patient to a Radiology Department.

C. Tuite, *Hospital of the University of PA, Philadelphia, PA, USA* · A. McBride · A. Patel · W. Stavropoulos · J. Mondschein · J.A. Solomon

PURPOSE: Chemoembolization (HACE) is one of several procedures for which an interventional radiologist may assume the longitudinal care of a patient. The support infrastructure required to provide such a service may be costly and could deter physicians from offering this service. We examined the downstream professional revenue to a radiology department derived from patients presenting for HACE.

MATERIALS AND METHODS: A retrospective chart review was performed of 74 patients referred over a six year period for HACE of primary and metastatic liver tumors. Each revenue generating activity for the radiology department associated with the care of the patient after the initial clinic visit was noted. This included each office visit, interventional radiologic procedures, subsequent inpatient care, and diagnostic imaging studies. For each activity, the total relative value units (RVUs) based on the corresponding Medicare national physician fee schedule were calculated. Professional compensation was calculated by multiplying the total RVUs by the corresponding year's conversion factor. The downstream revenue per patient was calculated by summing the respective individual professional compensation for each billed activity. The time value of money was ignored.

RESULTS: Histological tumor types included: colon cancer (25), hepatocellular carcinoma (29), neuroendocrine tumors (13), sarcoma (2), and breast cancer (5). The majority of patients received an initial consult from an interventional radiologist. 74/74 (100%) patients received at least one HACE, (range 1-9, average 2.35). Following HACE, patients were admitted to the interventional radiology service and were seen after discharge in the IR clinic when appropriate. The most commonly utilized non interventional radiology services included: CT scan (198), MRI (120), and plain film (76). The average professional revenue generated per patient was \$10,350.26 (max \$40,548.75, min \$3,240.44).

CONCLUSION: Caring for patients with unresectable hepatic malignancies can be time and labor intensive and carries an unknown cost. Knowledge of the lifetime value of a HACE patient to a radiology department may be an important factor in deciding whether to offer this service.

Scientific Session 18 Pediatric Interventions

**Saturday, March 27, 2004
12:30 PM - 2:00 PM**

*Moderator(s): Peter Chait, MD
Richard B. Towbin, MD*

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Abstract No. 93

Peritonitis Following Retrograde Percutaneous Gastrostomy (G) & Gastrojejunostomy Tube Insertion in Children.

B. Connolly, *The Hospital for Sick Children, Toronto, ON, Canada* · E. Mann · S. Mahant · P. Chait · J. Amaral · M. Temple, et al.

PURPOSE: Image guided retrograde percutaneous G & GJ-tubes are inserted in children who require long term tube feeding. Peritonitis, an uncommon complication, is a source of morbidity and mortality. Our aim was to determine incidence, associated factors, management and outcome of peritonitis following above procedure in children.

MATERIALS AND METHODS: Retrospective review of medical and imaging records of children who developed peritonitis < 30 days post G/GJ-tube insertion, over a 10 year period (1992 - 2002).

RESULTS: 22 of 1854 (1.19%) patients undergoing percutaneous G/GJ-tube insertions developed peritonitis, mean age 16 months (1 mth - 17yrs). Underlying diagnoses were neurological (59%), cardiac (23%), gastrointestinal (9%), and renal (9%). Peritonitis was associated with vomiting post procedure (15/22), inappropriate tube/suture manipulation (6), divergence from feeding plan (3/22), neutropenia (2), seizures (2). Imaging was often normal. Positive findings included worrisome pneumoperitoneum (11), G-tube displacement into peritoneum (3), contrast leak from gastric site (9), and one incidental appendicitis. Medical management (bowel rest, antibiotics, TPN) alone was successful in 12/22. 4 required percutaneous drains. Early in our experience, 3 patients had a laparotomy and 2 patients died prior to diagnosis.

CONCLUSION: Peritonitis following radiological G/GJ-tube insertion occurs infrequently, but requires clinical vigilance, daily rounds and a high index of suspicion to initiate successful early medical management and to avoid death.

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Abstract No. 94

Tunneled Peripheral Venous Port Insertion in Children: An 8-Year Experience.

K.M. Baskin, *The Children's Hospital of Philadelphia, Philadelphia, PA, USA* · A.M. Cahill · R.D. Kaye · C. Flowers · R.B. Towbin

PURPOSE: To review technique and outcomes related to tunneled peripheral venous ports (PVP) in children.

MATERIALS AND METHODS: Since 1995, 72 PVP were placed in 66 patients (39F, 27M) age 6-36 y (mean=15 y). Indications included malignancy (n=47), hematological disorder (n=16), osteomyelitis (n=2), Gaucher's disease (n=2), fibromatosis (n=2), other (n=3). Most were placed without GA, under conscious sedation (n=46) or local anesthesia (n=7). The left arm (n=53) and basilic vein (n=52) were preferred to the right arm (n=19) and brachial vein (n=20).