43.4% for the year we studied. Of the patients who received NACT, 19 met full Aletti Criteria at diagnosis, precluding them from being considered for surgery. In addition, 21 patients had medical contraindications to surgery, meaning that a total of 40 patients who were given NACT were not able to be considered for PDS. If we then take into account only the patients who were medically eligible for PDS, the rate of NACT at MSKCC drops to 23.1%, almost half of the original value. These medically eligible patients are the population that should be receiving an MSKCC resectability score. Of the 98 patients who underwent PDS, 73.5% had a preoperative resectability score calculated. Based on the algorithm, 81.3% of those patients were deemed to be "low risk" and 15.2% were deemed to be "high risk" of a suboptimal debulking. The algorithm dictates that all "high risk" patients who go on to PDS should undergo a laparoscopy first to assess for resectability and potentially avoid an unnecessary open procedure. Hundered percent of the "high risk" cases that were taken to the OR had an initial laparoscopy before proceeding with PDS. Overall, 93.1% of patients that underwent PDS had an optimal cytoreduction, or ≤1 cm residual disease at the conclusion of surgery. Of the 6 patients throughout the year that had a suboptimal outcome, or >1 cm residual disease, 3 were initially scored as "low risk," 1 was scored as "high risk," and 2 did not receive an MSKCC resectability score prior to their procedure. Of note, 3 of the suboptimal cases had unresectable disease in an anatomical location not accounted for in the resectability algorithm. DISCUSSION/SIGNIFICANCE OF IMPACT: The rates of PDS Versus NACT vary widely between institutions, and it is not always clear how calculations are made. High-volume centers likely see a higher percentage of sicker patients with more advanced disease, which could increase their rates of NACT as many of these patients are not eligible for surgery. It is important to standardize the way our field quotes NACT rates, and to understand how treatment decisions are being made at a given institution. PDS has a demonstrated survival benefit, and while we would ideally use this modality for all of our patients, there will always be a baseline percentage of patients who cannot be considered for the surgery. Since we will never be able to offer those patients PDS, our objective should be to identify patients who can be considered for the procedure and to work toward optimizing their outcomes. In this study we identified the population of patients who are truly the PDS Versus NACT cohort as they were eligible for both modalities. We then examined the application and utility of the MSKCC resectability algorithm in an attempt to further optimize treatment allocation. This scoring system was implemented at our hospital over the past year with the goal that 100% patients going on to PDS would receive a preoperative score. Unfortunately, 26.5% of PDS patients were not scored prior to their procedure. This makes it more difficult to evaluate the efficacy of the scoring system, especially considering 1/3 of the suboptimal cases were not scored. Had these patients received a score, they might have been deemed "high risk" and could have avoided a lengthy operation with a significant chance of a suboptimal outcome. In addition, it is important to note that 3 of the suboptimal PDS outcomes were initially scored as "low risk," and 3 of the suboptimal outcomes were due to disease locations not accounted for in the original resectability algorithm. We will continue logging disease locations of suboptimal cases, it is possible that a certain disease location not in the scoring system is responsible for a significant portion of suboptimal outcomes. The resectability score model had an overall predictive accuracy of 0.756 when it was initially published, and we must continue tracking scores and outcomes to determine its validity when applied prospectively in our population. In order to accurately do so however, an emphasis should be made to ensure 100% of patients being considered for PDS receive a score going forward.

2165

Effects of a novel 2-phase rehabilitation program on postural control in older adults: A pilot study

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OBJECTIVES/SPECIFIC AIMS: Falls are a major source of morbidity and disability in the aging population. Twenty to thirty percent of older adults who fall suffer moderate to severe injuries such as lacerations, hip fractures, and head traumas. A serious component of falling often overlooked is the fear of falling. The fear of falling is part of a debilitating spiral that leads to decreased activity and muscle weakness. The goal of this investigation was to determine if a novel 2-phase rehabilitation program designed to reduce the fear of falling and increase muscle strength could improve postural control during falls in older adults with balance impairments. METHODS/STUDY POPULATION: Four older adults participated in 8 cognitive restructuring workshops entitled A Matter of Balance (AMOB): 2 hours/week, total of 16 hours, designed to restructure thought patterns relative to falls and reduce the fear of falling. Within 1–2 weeks of completion, participants enrolled in Phase II: a standardized 10-week lower-extremity strengthening program. Participants performed high-intensity concentric resistance exercise on a modified seated ergometer (Eccentron, BTE Technologies) twice per week for up to 20 minutes per session. Fear of falling was assessed using the Activities-Specific Balance Confidence (ABC) scale. Postural control was assessed during reproducible falls at 3 phases: baseline (T0), after Phase I AMOB (T1), and after Phase II strengthening (T2). Falls were induced by treadmill perturbations (VGait system, MotekForce Link) occurring at slow and fast belt accelerations. A 3 × 3 ANOVA was conducted on postural control outcomes with phase and stepping cycle as independent factors. Pairwise comparisons were analyzed with the Bonferroni correction. RESULTS/ANTICIPATED RESULTS: Statistically significant main effects were found for phase and stepping cycle ($p = 0.003$, $p = 0.00$). No statistically significant interaction effects were found. However, a trend toward increasing Center of Pressure-Center of Mass (COP-COM) distance occurred after each intervention phase (T1 and T2) during fast treadmill perturbations. The greatest increase in COP-COM distance was found at 100% of the stepping cycle during fast perturbations following 10 weeks of resistance training compared with baseline ($p = 0.006$). No significant differences were found in fear of falling between phases ($p = 0.682$). DISCUSSION/SIGNIFICANCE OF IMPACT: A large COP-COM distance suggests the individual is able to allow straying of the COM outside of the functional base while recovering balance. Meanwhile, a small COP-COM distance represents a conservative approach to postural tasks, in that the performer does not feel stable enough to allow separation of the COP and COM. These pilot data suggest that a 2-phase rehabilitation program can improve specific components of postural control during recovery from falls. Rehabilitation interventions aimed at reducing falls in older adults should consider adding a component of cognitive restructuring in conjunction with standard of care resistance training.

2168

Lower rates of influenza infection following 2 dose series of high-dose vaccination in plasma cell disorders: Results of a randomized, double-blind, placebo-controlled study

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OBJECTIVES/SPECIFIC AIMS: (1) Evaluate safety of a novel influenza vaccination strategy in patients with plasma cell disorders. (2) Measure laboratory-confirmed influenza infection rates following a novel influenza vaccination strategy in patients with plasma cell disorders. (3) Evaluate clinical correlates of response following a novel influenza vaccination strategy in patients with plasma cell disorders. METHODS/STUDY POPULATION: We conducted a double-blind, randomized study over the 2015–16 flu season, comparing 2 doses of Fluzone® High-Dose influenza vaccination (separated by 30 d) to the current standard of care influenza vaccination. Patients were allocated to the experimental arm in 2:1 ratio compared with standard of care arm. Standard of care influenza vaccination was considered single age-based vaccination (standard dose for those <65 y and high dosefor those ≥65 y) and patients in this arm received a saline placebo injection at 30 days to assist in blinding. Eligibility criteria allowed any patient with a PCD and no contra-indication to trivalent inactivated influenza vaccine. The primary endpoint was laboratory-confirmed flu infection rate. Protocol-driven surveillance screened patients for flu-like illnesses and performed laboratory testing for influenza until the end of the flu season in May 2016. Secondary endpoints include HAI titer serologic response rates, clinical correlates of protection from influenza infection, and exploratory studies of cell-mediated immunity through characterization of T cell subpopulations, cytokine profiles, and flu-specific T-cell responsiveness. RESULTS/ANTICIPATED RESULTS: In total, 122 plasma cell disorder patients were enrolled (97 with disease requiring therapy and 25 with asymptomatic gammopathy). Of those 48 patients received a single standard of care influenza vaccination and 74 patients received 2 doses of Fluzone® high-dose vaccine. Median age was 67 years (range 42–90). This 2-dose vaccination strategy was safely tolerated in all patients with no grade 2 adverse events attributed to vaccine. With close clinical follow-up, only 4% of patients receiving 2 vaccine doses developed laboratory confirmed influenza Versus 8.3% of those receiving single vaccine. When compared to the expected CDC influenza infection rate of 10%–15%, 1 sample, 2-tailed binomial testing revealed patients receiving 2 vaccines experienced a significantly lower rate of infection than the expected rate ($p < 0.05$) whereas those receiving single vaccine showed no significant difference ($p = 0.38$). DISCUSSION/SIGNIFICANCE OF IMPACT: This randomized study demonstrates that the 2 dose strategy of Fluzone® high-dose influenza vaccine is safely tolerated in patients with plasma cell disorders and associated with significantly less than expected laboratory-confirmed influenza infections. The results suggest that this novel

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vaccination strategy may have a clinical benefit in reducing influenza infections in plasma cell disorder patients and thus may have practice changing implications. Final analyses of serologic responses, clinical correlates of response, and cell-mediated immune correlates may provide valuable insights into in vivo "immune-competence" in patients with plasma cell disorders.

2198

Gender differences in the pharmacology of buprenorphine sublingual tablets in Hispanics/Latinos: An underrepresented population

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OBJECTIVES/SPECIFIC AIMS: The objective of this study is the pharmacology of sublingual Buprenorphine in Hispanics/Latino men and women. Specifically we plan to: (1) Administer sublingual buprenorphine to Hispanic/Latino men and women volunteers, and measure the circulating amounts of the drug in the bloodstream as a function of time; that is, pharmacokinetics of buprenorphine. The goal of the proposed study is to evidence that there are gender and ethnic differences in the pharmacokinetics of sublingual buprenorphine between not only Hispanics/Latinos and non-Hispanics/Latinos (Caucasian), but also within Hispanic/Latino men and women. METHODS/STUDY POPULATION: We are proposing a phase 1 of buprenorphine using 12 healthy volunteers. To test for differences in pharmacokinetics between Hispanic/Latino men and women, 6 Hispanic/Latino men, and 6 Hispanic/Latino women 21 years of age and older will be recruited. The volunteers should be living in Puerto Rico, and must have both parents born in Puerto Rico. Sublingual buprenorphine will be administered using a low dose of 16 mg one time only. Blood samples will be collected from each volunteer at $t = 0$, 1, 2, 4, 6, 8, 12, and 24 hours after administration. The amount of circulating drug in the bloodstream of the volunteers will be measured using liquid chromatography combined with mass spectrometry. Pharmacokinetic obtained parameters will be maximal plasma concentration, minimal plasma concentration, predose concentration, 24 hour post predose concentration, the time for maximum concentration. The area under the curve will be determined by the trapezoidal rule. Male Versus female data will be compared using 2-tailed *t*-test. RESULTS/ANTICIPATED RESULTS: We anticipate that: (1) Hispanic/Latino women will have longer circulating times of the drug in the bloodstream and higher maximum concentrations, compared with men. (2) Hispanic/Latino men and women will have higher amounts of the circulating drug, compared with already reported pharmacokinetic data of non-Hispanic Caucasian men. DISCUSSION/SIGNIFICANCE OF IMPACT: Gender differences have been elucidated in the prevalence rates of substance abuse, health service utilization, treatment outcomes, and physiological consequences of drug consumption in the United States. It is known that in general, women progress from drug use to dependence must faster than men; women also suffer more severe physical and emotional consequences than men, yet women seek treatment for drug addiction in lower rates compared with men. Women also show lower pharmacological treatment effectiveness as they are less likely to feel satisfied upon entering a substance abuse treatment and they show higher cravings. Sublingual buprenorphine is a very popular and relatively new medication used primarily for opiate addiction since 2002. Gender differences have been elucidated in the pharmacology of buprenorphine sublingual tablets used for the treatment of opioid addiction. One study showed that women had higher concentrations of circulating parent drug and it is metabolites compared with men. One metabolite in particular norbuprenorphine was found in almost double the plasma concentration in women. Interestingly, gender differences were not pursued at all by the Pharmaceutical Company sponsoring the approval of the sublingual Buprenorphine by the FDA. The cytochrome enzyme CYP 3A4 responsible for the metabolism of Buprenorphine has higher activity in Caucasian/African American women compared with men. However these studies failed to design and recruit significant amount of patients with Hispanic ethnicity to adequately elucidate the gender differences within this ethnic group. Higher plasma concentrations and longer circulation times of a drug may result not only in lower efficacy outcomes but also higher toxicity and undesired effects. Unfortunately, the lack of pharmacological effectiveness and lack of satisfaction in women undergoing drug treatment programs has not been adequately studied to understand the gender difference in pharmacological treatment outcomes between Hispanic/Latino men and women. Due to the under-representation of Hispanic/Latino men but most importantly women in s studying the pharmacology of sublingual Buprenorphine, and considering the well-established gender difference of the principal enzyme (CYP 3A4) responsible for the pharmacology of Buprenorphine, we are proposing a pilot study of the pharmacology of sublingual Buprenorphine in Hispanic/Latino volunteers living in Puerto Rico with equal number of male and female patients. We expect our research to clinically and scientifically elucidate the gender differences of sublingual buprenorphine for opioid addiction in Hispanics/Latinos. The outcome of such research will be the foundation of subsequent clinical studies that aim in updating the current standard of care for Hispanic/Latino men and women that require therapy for opioid addiction.

2203

Engraftment and gene expression of an HIV resistant immune system in a Phase I trial of an HIV stem cell gene therapy strategy

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OBJECTIVES/SPECIFIC AIMS: To date, only 1 documented case of an individual cured of HIV has been reported. He received an allogeneic bone marrow transplant with cells harboring an HIV-resistant genotype. To mimic this result, we have initiated a Phase I to evaluate the safety of an autologous stem cell gene therapy bone marrow transplant in HIV-related lymphoma patients. METHODS/STUDY POPULATION: The first cohort of patients will receive a 1:1 ratio of unmanipulated CD34 hematopoietic stem cells (HSC) and lentivector modified CD34 HSC expressing a combination of HIV-resistant genes and a selectable marker for cell sorting prior to transplantation. Safety of the HIV-resistant stem cells will be assessed by evaluating engraftment, expression of the anti-HIV genes, and the stability and sequence of the vector. RESULTS/ANTICIPATED RESULTS: One patient has been enrolled and transplanted with the HIV-resistant stem cells. After 1 and 2 months post-transplant, patient blood samples were received, processed for genomic DNA, analyzed by quantitative PCR (qPCR), and displayed successful engraftment of 16 and 12 vector copies per 100 cells, respectively. Expression of all anti-HIV genes was confirmed by qPCR. PCR on genomic DNA confirmed the correct sizes and sequences of the integrated vector and confirmed the successful engraftment of our gene modified cells. Currently, we are enrolling more patients into the trial. DISCUSSION/SIGNIFICANCE OF IMPACT: If successful, this therapy has the potential to change HIV treatment.

2207

A Phase I dose escalation trial of nab-paclitaxel and fixed dose radiation in patients with unresectable or borderline resectable pancreatic cancer

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OBJECTIVES/SPECIFIC AIMS: Patients with locally advanced pancreatic cancer typically have poor outcomes, with a median survival of ~16 months. Novel methods to improve local control are needed. Nab-paclitaxel (abraxane) has shown efficacy in pancreatic cancer and is FDA approved for metastatic disease in combination with gemcitabine. Nab-paclitaxel is also a promising radiosensitizer based on laboratory studies, but it has never been clinically tested with definitive radiotherapy for locally advanced disease. METHODS/STUDY POPULATION: We performed a phase 1 study using a 3 + 3 dose-escalation strategy to determine the safety and tolerability of dose escalated nab-paclitaxel with fractionated radiotherapy for patients with unresectable or borderline resectable pancreatic cancer. Following induction chemotherapy with 2 cycles of nab-paclitaxel and gemcitabine, patients were treated with weekly nab-paclitaxel and daily radiotherapy to a dose of 52.5 Gy in 25 fractions. Final dose-limiting toxicity (DLT) determination was performed at day 65 after the start of radiotherapy. RESULTS/ANTICIPATED RESULTS: Nine patients received nab-paclitaxel at a dose level of either 100 mg/m^2 ($n = 3$) or 125 mg/m^2 ($n = 6$). One DLT (grade 3 neuropathy) was observed in a patient who received 125 mg/m^2 of nab-paclitaxel. Other grade 3 toxicities included fatigue (11%), anemia (11%), and neutropenia (11%). No grade 4 toxicities were observed. With a median follow-up of 8 months (range 5–28 months), median survival was 19 months and median progression-free survival was 10 months. Following chemoradiation, 3 patients underwent surgical resection, all with negative margins and limited tumor viability. Of the 3 patients, 2 initially had borderline resectable tumors and 1 had an unresectable tumor. Tumor (SMAD-4, Caveolin-1) and peripheral (circulating tumor cells and microvesicles) biomarkers were collected and are being analyzed. DISCUSSION/SIGNIFICANCE OF IMPACT: The combination

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