

The mean Vitamin D-25(OH) level was 21.4 ± 11.4 ng/mL, ranging between 5.0-63.0 ng/mL. Twelve (17.4%) of studied patients had ≤ 10 ng/mL VitD-25(OH) level, 34 (48.6%) had ≤ 20 ng/mL VitD-25(OH) level, and 54 (66.0%) had < 30 ng/mL VitD-25(OH) level. Persons with a complete injury demonstrated Vitamin D-25(OH) levels lower than persons with incomplete injuries (19.4 versus 26.4 ng/mL; $P = .017$). Males had a significantly lower mean Vitamin D-25(OH) levels in comparison to females (20.40 versus 32.11 ng/mL; $P = .009$). Although the absolute mean Vitamin D-25(OH) value for Hispanic subjects was markedly lower when compared with Caucasians versus Blacks versus Asians, it was not statistically significant (18.7 versus 22.4 versus 27.0 versus 25.2 ng/mL; $P = .198$). Our results show no significant association between Vitamin D-25(OH) and chronic wounds, pain and depression (21.7, $P = .993$ versus 21.3, $P = .943$ versus 20.4 ng/mL; $P = .458$).

Conclusions: Deficient levels of Vitamin D-25(OH) were highly prevalent in subjects with chronic SCI in an outpatient setting. Vitamin D-25(OH) deficiency was associated with complete injury and male gender. Baseline evaluation of serum Vitamin D-25(OH) levels with subsequent close monitoring and supplementation are recommended in patients with chronic SCI.

Poster 516 **Spinal Cord Injuries in a Referral Center in São Paulo, Brazil.**

Roberto D. Rached, MD (Clinics Hospital of University of São Paulo, São Paulo, Brazil); Daniel R. Souza, MD, PhD; Chen C. Yuan, MD, PhD.

Disclosures: R. D. Rached, No Disclosures.

Objective: The present study aimed to describe the epidemiological characteristics of traumatic spinal cord injury (SCI) patients and their main complications in acute/sub acute phase in a referral center in São Paulo, Brazil.

Design: Retrospective study of medical charts of 359 patients hospitalized from January 2003 to December 2009 in our Institute. We obtained demographic data, the classification according to the American Spinal Injury Association (ASIA) and the prevalence of the most common complications in the acute phase of the spinal cord injuries such as urinary tract infection, pressure sores, bronchopneumonia, deep vein thrombosis and heterotopic ossification.

Setting: Institute of Orthopedics and Traumatology of Clinic Hospital of Faculty of Medicine of University of São Paulo.

Results: There was a predominance of male patients (83%), mean age was 36 years old (SD = 15) ranging between 1 and 85 years old. The majority were paraplegic (59%) and had complete spinal cord injury (Frankel A). The most common causes were falls (42%), car accidents (38%), injuries by firearms (14%) and diving into shallow water (6%). Among traffic accidents there was a major involvement of motorcycle accidents and car crashes. We noticed that there is a tendency for reduction in car accidents and an increase in the numbers of motorcycle accidents. There is a tendency for the increase of SCI caused by firearms. Most common clinical complications were: urinary tract infection 60.0%; pressure sores 45.0%; bronchopneumonia 22.5%; heterotopic ossification 15.3% and deep venous thrombosis 6.4%.

Conclusions: In our hospital, the main causes of spinal cord injuries are traffic accidents and falls. The majority of patients are men and there is a ratio of 1 woman to 5 men. Most of the patients

present severe neurological injuries (ASIA A). Complications in the acute phase are very common and most prevalent are urinary tract infections, pressure ulcers and bronchopneumonia.

Poster 517 **Spinal Cord Injury After a Roller Coaster Ride in a Patient with Previously Undiagnosed Ankylosing Spondylitis: A Case Report.**

Sara Z. Salim, MD (UMDNJ-New Jersey Medical School, Newark, NJ, United States); Peter Yonclas, MD.

Disclosures: S. Z. Salim, No Disclosures.

Case Description: The patient is a 49-year-old man without any significant past medical history except for chronic neck stiffness who rode a roller coaster at an amusement park. During the ride he felt a sudden pain in his neck followed by weakness of all four limbs. He was transported emergently to the nearest hospital where he presented with tetraplegia.

Program Description: A 49-year-old man with a history of chronic neck stiffness.

Setting: Surgical intensive care unit.

Results or Clinical Course: Magnetic resonance imaging revealed a fracture through the C6-C7 disc space extending to the posterior elements with 12mm of distraction. There was retropulsion of fragments of the C6 vertebral body and an epidural hemorrhage at the C6-C7 level causing spinal cord compression. Incidentally, there was extensive fusion of the vertebral bodies and facet joints, a finding suggestive of ankylosing spondylitis. Subsequent detailed examination by the psychiatry consult service revealed C6 AIS A tetraplegia. HLA B27 was found to be positive.

Discussion: Ankylosing spondylitis results in unregulated bone formation and resorption in the vertebral column. Ectopic bone formation leads to a fused spine and brittle ligaments that are biomechanically unsuited to transmit forces from trauma. Bone resorption results in an osteoporotic and weakened spine with increased susceptibility to fractures. Disc ossification results in fractures through the disc space extending to the posterior elements. This produces a very unstable fracture with increased likelihood of distraction and hematoma formation. Spinal cord injury is often complete, severe, and involves the cervical level. Neck hyperextension is the most common mechanism of injury.

Conclusions: Patients with ankylosing spondylitis have a greater likelihood of spinal cord injury due to an increased susceptibility to vertebral fractures. Presented is a case of spinal cord injury following a roller coaster ride in a patient with previously undiagnosed ankylosing spondylitis.

Poster 518 **Calorie and Protein Intake in Acute Rehabilitation Inpatients With Spinal Cord Injury Versus Other Diagnoses: A Prospective Cohort Study.**

Sara E. Zimmerman, MD (Wayne State University/Rehabilitation Institute of Michigan, Detroit, MI, United States); Anthony J. Pellicane, MD.

Disclosures: S. E. Zimmerman, No Disclosures.

Objective: The purpose of this study was to compare calorie and protein intake in spinal cord injury (SCI) acute rehabilitation inpatients to patients with other diagnoses in the same setting. It was hypothesized that SCI rehabilitation inpatients consume signifi-

cantly more calories and protein than other inpatient rehabilitation diagnoses.

Design: Prospective cohort study.

Setting: Acute inpatient rehabilitation facility.

Participants: 78 inpatients.

Interventions: Weekly calorie and protein intake calculations by registered dietitians.

Main Outcome Measures: Mean calorie and protein intake.

Results: Mean calorie intake (kcal) for the SCI, traumatic brain injury (TBI), Stroke, and Parkinson's groups was 1967.9 ± 611.6 , 1546.8 ± 352.3 , 1459.7 ± 443.2 , and 1459.4 ± 434.6 , respectively. ANOVA revealed a significant overall group difference [$F(3,74)=4.74$, $P=.004$]. Pairwise comparisons showed significant differences between SCI and Stroke ($P=.003$) and SCI and Parkinson's ($P=.045$). Mean calorie intake per body weight (kcal/kg) for the SCI, TBI, stroke, and Parkinson's groups was 24.4 ± 9.8 , 20.4 ± 5.3 , 17.4 ± 8.4 , and 19.2 ± 6.6 , respectively. ANOVA again revealed a significant overall group difference [$F(3,74)=2.84$, $P=.044$]; however, pairwise comparison only found a significant difference between SCI and Stroke ($P=.025$). Mean protein intake (g) for the SCI, TBI, Stroke, and Parkinson's groups was 71.5 ± 25.0 , 61.1 ± 12.8 , 57.6 ± 16.6 , and 55.1 ± 19.1 , respectively. ANOVA revealed a marginally significant overall group difference [$F(3,74)=2.50$, $P=.066$]. Pairwise comparisons only found a marginally significant difference between SCI and Stroke ($P=.060$). Mean protein intake per body weight (g/kg) for the SCI, TBI, Stroke, and Parkinson's groups was 0.89 ± 0.39 , 0.81 ± 0.18 , 0.68 ± 0.29 , and 0.73 ± 0.28 , respectively. ANOVA did not reveal a significant difference between the groups [$F(3,74)=1.97$, $P=.126$].

Conclusions: Given the diet-related comorbidities and decreased resting metabolic rate associated with SCI patients in combination with the intake levels demonstrated in this study, education with regard to appropriate calorie and protein intake in patients with SCI should be employed in the acute inpatient rehabilitation setting.

Poster 519

Acute Cervical Myelopathy Caused By Chiropractic Manipulation in a Young Person With a Cervical Osteochondroma: A Case Report.

Sarah Humbert, MD (Loma Linda University, Loma Linda, CA, United States); Murray E. Brandstater, MD, PhD.

Disclosures: S. Humbert, No Disclosures.

Case Description: The patient had a 2-year history of left-arm paresthesias, but no other disability, and went to a chiropractor for neck pain. Promptly following cervical manipulation he developed quadriparesis. Computed tomography revealed a bony outgrowth arising from the left lamina of cervical vertebrae two (C2) extending into the spinal canal. The mass, radiographically consistent with an osteochondroma, caused severe cord compression. The T2-signal was increased from the foramen magnum to level C3 suggestive of a coinciding cord contusion. An emergent C2 laminectomy and extradural mass resection was performed. On admission to rehabilitation, the patient had clinical findings of an incomplete cervical myelopathy. Physical examination revealed right-sided weakness, 3/5 and 4/5 in the arm and leg muscles, respectively. Tone was increased in the right leg with clonus at the ankle. He had sensory disassociation with crossed impairment of light-touch, pain and

temperature sensation from C2 caudally and uncrossed diminished vibration and proprioception. These features indicated a lesion mainly involving the right hemi-cord, or Brown-Séquard Syndrome.

Setting: Acute inpatient rehabilitation unit.

Results or Clinical Course: At 6-month follow-up he continues to have residual sensorimotor deficits.

Discussion: Spinal osteochondromas are rare with an incidence of <4% and can cause myelopathy due to mass-effect. Over time subtle myelopathic symptoms may occur as the spinal cord becomes tethered by the enlarging mass but go relatively unnoticed. This predisposed the patient to a higher risk of injury associated with chiropractic manipulation that ultimately resulted in cord contusion and acute neurological deterioration.

Conclusions: Despite having antecedent paresthesias this patient underwent chiropractic manipulation causing an acute cervical myelopathy because of an unrecognized osteochondroma at C2. Individuals contemplating chiropractic manipulation of the spine should first be cleared of any underlying orthopedic or neurologic disorder, and vigorous manipulation should always be avoided.

Poster 520

Bladder Cancer Presenting as Autonomic Dysreflexia: A Case Report.

Simerpreet Singh, MBBS, MPH (University of Rochester, Rochester, NY, United States); Douglas R. Fetkenhour, MD.

Disclosures: S. Singh, No Disclosures.

Case Description: A 50-year-old high functioning man with history of incomplete lower cervical tetraplegia from an accident 28 years ago, with new onset autonomic dysreflexia (AD). His symptoms included sudden flushing, sweating profusely on face and elevated SBP during these episodes to 140s. Patient reported he started having these episodes about 4 months before and they were getting worse. His bladder and bowel program was going well and had been on and off treatment for UTI. He reported getting 2nd degree coffee burns on thigh and scrotum; those were still healing. He also had a chronic pressure sore on right medial malleolus, which had been there for years, and had chronic low back pain. He denied any significant weight loss, fevers or chills.

Setting: Outpatient.

Results or Clinical Course: Basic blood work was unrevealing and UA revealed UTI, which was not unusual for him. A bone scan was negative for osteomyelitis or any new HO. Ultrasound examination of the kidney was normal. A cystoscopy was done that showed 2 large necrotic masses attached to the bladder wall; further imaging and tissue biopsy revealed urothelial carcinoma with giant cells and extensive necrosis and spread. He chose to take a more comfort care approach.

Discussion: Spinal cord injury with neurogenic bladder is a risk factor for bladder cancer and is often described in literature; although it is rare, it should be on differential, especially in old spinal cord injury patients. UTI, presence of burn, chronic ulcer, and severe back pain at times all were potential triggers for causing AD in this patient. However the most interesting symptom in this case was AD in an incomplete tetraplegic patient without history of AD and with investigation revealing urothelial carcinoma; we think his AD was most likely a response to these necrotic masses in his bladder.

Conclusions: For patients with old spinal cord injury presenting