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## The Effect of Weather on Orthopedic Injury Presentation to the Emergency Department

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## The Incidence, Prevalence and Burden of Gout in the Veterans Health Administration

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**Mentor:** Ted Mikuls and Bryant England

**Program:** Internal Medicine, Division of Rheumatology

**Type:** Original Research

**Background:** To determine the prevalence, incidence, and burden of gout in the Veterans Health Administration (VHA) from 2005-2014.

**Methods:** We used national VHA data from 1/1999-12/2014 to determine the annual incidence and prevalence of gout in the VHA. Gout burden to the VHA was determined by the proportion of patients with

an encounter related to gout. Rates of urate lowering therapy (ULT) and opiate use were determined annually. Characteristics of those with and without gout were compared using 2014 data.

**Results:** From 2005 to 2014, gout prevalence in the VHA increased from 4.2% to 5.8% while disease incidence ranged from 5.8 to 7.4 cases per 1000 patient-years. Gout prevalence was highest among men, older patients, and non-Hispanic blacks. During 2014, 4.0% of all inpatient or outpatient encounters and 1.3% of hospitalizations were gout-related. ULT administration remained stable over the ten-year period, with 46%

of gout patients receiving ULT in 2014. In contrast, 16.4% of prevalent gout patients were receiving a weak opioid in 2014, nearly doubling the prescription rate of weak opioids in 2005 while the use of stronger opioids did not change significantly over this period. Patients with gout had greater comorbidity and healthcare utilization than patients without gout.

**Conclusion:** The burden posed by gout in the VHA is considerable and increased between 2005 and 2014. While the use of ULT has remained stable, the use of opioid therapy has increased among patients with gout. ■

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## A Beer League Degloving

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**Program:** Family Medicine

**Type:** Case Report

**Introduction:** Morel-Lavallée lesions are rare, closed degloving injuries between the skin and underlying fascia that creates a fluid collection within the pre-fascial plane. Common causes are high-energy, blunt force trauma and crush injuries.

**Case:** A 29-year-old male who presented with left thigh pain, swelling and ecchymosis after attempting a "pop-up" slide into third base during a softball game. His foot caught the base and he flipped forward on his extended

knee. He had immediate swelling and pain but ambulated off the field. In clinic two days later, he reported increased swelling and bruising but denied loss of strength or instability. Exam showed thigh swelling and large ecchymosis throughout the thigh and into the knee and upper shin. He had reduced flexion but preserved extension. MRI demonstrated a large anteromedial thigh fluid collection, consistent with large Morel-Lavallée lesion. He successfully treated conservatively with tight compression and activity restriction. With serial follow-ups and evaluation with sports medicine, the patient continued to improve.

**Discussion:** Prompt compressive therapy obviates complications of infection, fluid expansion and tissue necrosis, which when present require more invasive interventions. With small, acute lesions, compression alone often suffices for resolution, however, larger lesions can require percutaneous drainage, sclerodesis or debridement. Our case highlights the need to consider Morel Lavallée lesions in expanding soft tissue injuries, even when not associated with high velocities. ■

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## The Effect of Weather on Orthopedic Injury Presentation to the Emergency Department

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**Mentor:** Aaron Barksdale

**Program:** Emergency Medicine

**Type:** Original Research

**Background:** Predicting patient flow and presentation in the emergency department (ED) is difficult. Chief complaints vary and often appear random from an anecdotal perspective. Prior studies attempting to correlate weather conditions with orthopedic injuries have been conflicting. The purpose of this study was to explore associations between weather patterns and orthopedic presentations to the UNMC ED.

**Methods:** Retrospective chart review was conducted at a tertiary academic hospital with 64,000 annual ED visits. Utilizing electronic medical records, all patients visiting the ED between 9/1/2012 to 4/30/2019 were included. ICD10 codes identified patients diagnosed with fractures of upper (distal forearm through wrist) and lower (proximal femur and hip) extremities. Daily weather patterns were obtained through the National Oceanic and Atmospheric Administration, specifically daily temperature, amount and type of precipitation (none, rain/melted snow, ice/snow). Logistic regression was used to determine if weather conditions were predictive of fractures. Results are displayed as odds ratios and 95%

confidence intervals.  $P < 0.05$  was considered statistically significant.

**Results:** Over an 80-month period 373,409 patients were included, with 4,416 fractures identified. Overall, there was a statistically significant association between snow/ice and fractures ( $p < 0.0001$ ). Specifically, an increased risk of upper extremity fracture (OR 1.47, CI 1.28-1.69) and lower extremity fracture (OR 1.25, CI 1.02-1.53). The risk of upper extremity fracture further increased when snow/ice accumulation was  $> 3$  inches (OR 2.64, CI 1.91-3.65). Rain/melted snow was not associated with increased fractures.

**Conclusion:** There is a significant association between upper and lower extremity fractures with snow/ice accumulation, but not rain/melted snow. ■

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## The Diagnostic Utility of a Myeloid Mutational Panel for Myelodysplastic Syndromes and Myelodysplastic/Myeloproliferative Neoplasms

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**Mentor:** Yuan Ji

**Program:** Pathology, Division of Hematopathology

**Type:** Original Research

**Background:** The diagnosis of myelodysplastic syndromes (MDS) and myelodysplastic/myeloproliferative neoplasms (MDS/MPN) is based on morphology and cytogenetics/FISH findings per 2017 WHO classification. With rare exceptions (e.g. SF3B1 mutations), somatic mutations have not been incorporated as diagnostic criteria. In this study we analyzed the utility of mutational analysis with a targeted 54-gene or 40-gene next generation sequencing (NGS) panel in diagnosis of MDS and MDS/MPN.

**Methods:** The clinicopathologic data and NGS results of patients with unexplained cytopenia with or without cytosis who underwent a bone marrow (BM) biopsy and had sequencing with either a 54 gene Trusight Myeloid or a 40 gene OncoPrint Myeloid NGS Assay performed at our institution from 2017 to 2019. Morphologic diagnosis of BM biopsy based on 2017 WHO classification was considered gold standard.

**Results:** A total 74 patients were identified, including 25 low-grade MDS (peripheral

blood blasts <1% and BM blasts <5%), 16 high-grade MDS (peripheral blood blasts 2-19% and BM blasts 5-19%), 5 therapy-related MDS, 14 MDS/MPN, and 14 morphological negative ones. Of 74 patients, 158 somatic mutations involving 37 genes were detected and had variant allele frequency (VAF) ranging from 3% to 99%. 62% (23/37) genes showed recurrent mutations and 38% (14/37) genes had one mutation each. The most common mutated genes were TET2, ASXL1, RUNX1, SF3B1 and TP53. Morphological negative, low-grade MDS, high-grade MDS, therapy-related MDS and MDS/MPN showed an average number of somatic mutations with a mean VAF: 1.5/20%, 2/37%, 3.1/38%, 2/33% and 4.8/41%, respectively. Mutations in TP53, RUNX1, or ASXL1 were associated with high-grade and therapy-related MDS (p=0.004), while SF3B1 mutations were associated with low-grade

MDS (p=0.001). In 60 of 74 patients with a diagnosis of MDS or MDS/MPN, 32 showed abnormal cytogenetics and 28 showed normal cytogenetics. One or more mutations were detected in 25 of 28 (89%) MDS or MDS/MPN patients with normal cytogenetics. The sensitivity, specificity, and positive predictive value (PPV) and negative predictive value (NPV) of mutations for MDS and MDS/MPN with different cutoffs are summarized in Table 1.

**Conclusion:** A myeloid mutational panel provides additional evidence of clonality besides cytogenetics/FISH studies in diagnosis of cytopenia with or without cytosis, and ≥ 2 mutations with ≥ 10% VAF highly predicts MDS and MDS/MPN with a PPV of 100%. ■

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**Table 1.**

Diagnostic performance of mutations for MDS and MDS/MPN with different cutoffs.

	Any mutations (VAF≥1%)	VAF≥20%	≥2 mutations	VAF≥10% and ≥2 mutations	VAF≥10% and ≥2 mutations, or abnormal cytogenetics/FISH
<b>Sensitivity</b>	<b>87%</b>	<b>75%</b>	<b>58%</b>	<b>58%</b>	<b>83%</b>
<b>Specificity</b>	<b>50%</b>	<b>93%</b>	<b>93%</b>	<b>100%</b>	<b>86%</b>
<b>PPV</b>	<b>88%</b>	<b>98%</b>	<b>98%</b>	<b>100%</b>	<b>96%</b>
<b>NPV</b>	<b>47%</b>	<b>46%</b>	<b>34%</b>	<b>36%</b>	<b>54%</b>

## Coronary Artery Bypass Grafting Versus Percutaneous Coronary Intervention for Left Main Disease in Chronic Kidney Disease Patients

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**Mentor:** Andrew Goldsweig

**Program:** Internal Medicine, Division of Cardiovascular Disease

**Type:** Review/Meta-analysis

**Background:** Limited data exists on the optimal revascularization strategy for patients with left main coronary artery disease

(LMCAD) and chronic kidney disease (CKD). We conducted this updated meta-analysis to compare the outcomes of coronary artery bypass graft (CABG) versus percutaneous coronary intervention (PCI) in this population.

**Methods:** Multiple electronic databases were searched for studies comparing CABG and PCI in CKD patients undergoing

revascularization of LMCAD (> 50% diameter stenosis). CKD was defined as estimated glomerular filtration rate of < 60 ml/min/1.73 m<sup>2</sup>. Primary outcome of interest was long term major adverse cardiovascular and cerebral events (MACCE) which was a composite of cardiovascular death, myocardial infarction (MI), stroke and repeat revascularization. Other outcomes of interest