notes, imaging, and labs in a subset of this population to assess reasons for the delay. On 8/11/18, a new outpatient infusion center (OIC) therapy plan went into place. This plan bundled a one-year denosumab order (2 doses) with an automatic referral to the OIC along with physician reminders for renewal. We compared rates of delayed denosumab dosing before and after implementation of this new order process.

RESULTS:
Between 1/1/16-8/11/18, 385 patients received 1295 doses of denosumab, with 160 (41.6%) receiving 193 instances of delayed doses. We reviewed the charts of 98 individuals who received 111 instances of late doses between 7/6/16-8/11/18. The most prevalent reasons for delays were: delays in follow-up by the patient (27.9%), delays in the provider placing an order for the drug and OIC referral simultaneously (27.9%), and delays in OIC scheduling (18%). During the 14 months after implementation of the new ordering process, 347 patients received 614 instances of denosumab, of which 123 (35.4%) received 128 instances of delayed dosing. This is a relative decrease of 17.5% (p=0.09) for the proportion of patients with a late dose.

CONCLUSIONS AND FUTURE DIRECTIONS:
Nearly half of the patients on denosumab in our hospital received delayed denosumab dosing. Delays were often due to a lack of coordination between subsequent dose order placement and referral to the OIC. Our institution successfully implemented a bundled therapy plan to improve timely dosing. By March 2020, we expect to reassess the post-intervention group to further describe reasons for dosing delays. We also will compare rates of VFs associated with delayed denosumab dosing pre- and post-intervention periods.

Cardiovascular Endocrinology
PATHOPHYSIOLOGY OF CARDIOMETABOLIC DISEASE
PCSK9 and Lp(a): Association Between PCSK9 Level and Larger Apo(a) Isoform Size in African-Americans and Caucasians
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SUN-580
Introduction: An elevated level of lipoprotein(a) [Lp(a)] is an independent causal risk factor for cardiovascular disease. Non-genetic factors do not appreciably influence Lp(a) levels due to a strong genetic control. However, inhibition of proprotein convertase subtilisin/kexin type 9 (PCSK9) has been shown to reduce Lp(a) levels. The association of PCSK9 with Lp(a) level and its major genetic determinant—apolipoprotein(a) [apo(a)] size—is not fully understood. In this study, we assessed the relationship between PCSK9, Lp(a) level, apo(a) size, age, and race/ethnicity.

Methods: Healthy Caucasian and African-American families were recruited from the general population (age range: 674 years, N=267). PCSK9 and Lp(a) levels were assayed enzymatically; apo(a) isofrom and LPA allele sizes and isofrom-specific Lp(a) levels were determined.

Results: In all participants, PCSK9 levels differed significantly by race/ethnicity, age, and sex. Thus, the mean PCSK9 levels were significantly higher in African-Americans vs. Caucasians (104 ± 29 vs. 95 ± 30 ng/mL, respectively, p=0.020), in adults vs. children (102 ± 29 vs. 92 ± 31 ng/mL, respectively, p=0.001) and in females vs. males (103 ± 30 vs. 94 ± 29 ng/mL, respectively, p=0.007). PCSK9 levels were not associated with total plasma Lp(a) levels neither in all participants nor in ethnicity-specific analyses. However, PCSK9 levels were significantly and positively associated with isofrom-specific Lp(a) levels.
Tumor Biology
TUMOR BIOLOGY: DIAGNOSTICS, THERAPIES, ENDOCRINE NEOPLASIAS, AND HORMONE DEPENDENT TUMORS

Clonal Status of Multigland Disease Primary Hyperparathyroidism

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SUN-137
Abstract: Primary hyperparathyroidism (PHPT) is a common endocrine disorder that arises due to single or multiple parathyroid gland disease (MGD). The molecular mechanism(s) of parathyroid neoplasia are incompletely understood and both monoclonal (mono-X) and polyclonal (poly-X) parathyroid tumors have been described using methylation-sensitive PCR of X-linked Human Androgen Receptor (HUMARA) alleles. Our previous investigations of parathyroid tumor clonal status has shown that poly-X tumors are common and are associated with MGD in patients with non-familial PHPT (Shi et al. 2014 & 2018).

This work examined the clonal status of the dominant gland and the clonal relationship of multiple tumors from the same patient has not been examined. The goal of the current study was to determine the clonal relationship of parathyroid tumors from PHPT patients with MGD. Banked parathyroid tissues from twenty-nine PHPT patients with MGD were examined in this study. Clonal status (mono-X vs poly-X) of multiple abnormal parathyroid glands from each patient was determined using a modification of the HUMARA assay used in our prior work. Briefly, methylation-sensitive PCR of HUMARA alleles was performed followed by fragment analysis using Capillary-Electrophoresis performed. Raw fragment sizing data analyzed using Peak Scanner software. Classification of samples as either mono-X or poly-X was made as described in (Shattuck et al.) Of 29 PHPT patients with MGD, 13 (45%) had pure mono-X, 5 (17%) had pure poly-X, and 11 (38%) had a mixture of mono-X and poly-X tumors. Five of 29 patients had

Thyroid
THYROID NEOPLASIA AND CANCER

Calcitonin-Based Thyroidectomy Is a Safe Approach in Patients with Germline RET Mutation and Permits to Delay Surgery in Children

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MON-490
Introduction: Medullary thyroid cancer (MTC) arises from C cells secreting calcitonin. In familial MTC cases, a germline RET mutation is discovered in 98% of cases. Nowadays, an early diagnosis and radical surgery are the only curative approach. However, thyroidectomy in children is associated with a higher rate of surgical adverse events, compared to surgery in adults. The best clinical approach in patient harboring germline RET mutation (gene carriers, GC) is still undefined. Methods and materials: since 1994 to 2018 we identified 174 GC by RET screening. 56 GC underwent total thyroidectomy and lymph node dissection for the evidence of high calcitonin levels at the first clinical evaluation, whereas 27 GC underwent surgery for high stimulated calcitonin levels during the active surveillance (median 16 months, range 13-118). 90 GC are still in follow up. Results: In the group of 27 GC patients who underwent surgery during the active surveillance, 15 GC had only C cells hyperplasia (CCH) foci and 12 were affected by MTC. These carcinomas were all confined to the thyroid glands. These patients are still in clinical remission, after a median follow up 4 years (range 1-11). At time of the surgery, the patients affected by MTC were significantly older than patients harboring only CCH (median 49 vs 30 years old, respectively). Among these 27 GC, 7 were diagnosed as GC when they were younger than 18 years (median 7 years old, range 2-18) and they underwent surgery after a median...