

subcutaneous depots and how these profiles correlate with fat fraction. **METHODS/STUDY POPULATION:** Recruited patients undergoing open-heart surgery provided informed consent at their second visit and underwent laboratory testing and imaging (cardiac magnetic resonance including water-fat imaging and coronary calcium computed tomography) prior to their surgery. Cardiac function such as cardiac chamber volume, mass, function, and strain, and depo-specific fat fraction were calculated from cardiac MR and Agatston calcium score and epicardial adipose volume from CT images. At the time of surgery, a tissue specimens from the epicardial, extrapericardial, and subcutaneous depots were obtained for transcriptomic and lipidomic analysis. Linear and logistic regression analyses adjusted for other variables were performed to evaluate significance level between variables. **RESULTS/ANTICIPATED RESULTS:** 37 subjects were enrolled in the study, 13 (35%) of which were women. Cardiac function and fat fraction was quantified in all patients, whereas tissue analyses were performed in 22 patients. Epicardial and extrapericardial fat fraction were independently associated with coronary atherosclerosis (p-value 0.01 and 0.04 respectively) Only epicardial fat fraction was negatively associated with global circumferential shortening of the left ventricle (0.03), while neither the extrapericardial fat fraction nor epicardial adipose volume were not (p =0.33 and 0.97 respectively) All three adipose depots have unique gene signatures with differentially expressed genes and pathways. RNA sequencing of epicardial, extrapericardial, and subcutaneous depots demonstrated tight clustering of epicardial and subcutaneous signatures based on PCA analysis (Figure 2). 19 lipid classes and 59 lipids showed differential expression between at least 2 of the fat depots (Figure 3). Hierarchical clustering of the lipids showed that epicardial and extrapericardial depots were more closely related than subcutaneous adipose. Plasmalogen-phosphatidylcholines, with an ether-linked fatty acid at the sn-1 position of the lipid, were higher in subcutaneous fat while most other lipids were higher in epicardial fat per tissue weight, such as ceramides (p=0.002). **DISCUSSION/SIGNIFICANCE OF IMPACT:** Epicardial, extrapericardial, and subcutaneous adipose depots express different lipidome and transcriptome signatures and different pathways. GSEA analysis demonstrated enrichment of genes related to antigen presentation and B cell immunity in epicardial compared to subcutaneous adipose tissue. Epicardial fat fraction is associated with coronary atherosclerosis and decreased left ventricular global circumferential shortening as an early predictor of decreased left ventricular stroke volume. Epicardial fat fraction is also associated with ceramides which may play role in the development of coronary atherosclerosis and decreased cardiac function.

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### US trends in diet and exercise counseling for patients with and without diabetes: The National Ambulatory Medical Care Surveys, 2005-2015

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**OBJECTIVES/SPECIFIC AIMS:** Type 2 diabetes (T2D) is costly and burdensome, but strong evidence exists that lifestyle change and weight loss can improve glycemic control and lower co-morbidities for patients with T2D. We used national data to examine whether the frequency of diet and/or physical activity counseling for patients with T2D in ambulatory settings has been responsive to

accumulation of evidence supporting lifestyle change. **METHODS/STUDY POPULATION:** We used National Ambulatory Medical Care Survey (NAMCS) data over the period 2005-2015 from 31,475 patients with provider-reported T2D. We built multivariate logistic regression models, adjusting for patient, provider, and practice level characteristics (i.e. patient demographics, physician specialty, site of care, and region), to assess changes over time in the provision of diet or exercise counseling during ambulatory care visits, as reported through provider/staff chart review. We also examined whether changes in counseling over time varied by key patient and provider characteristics. We used non-overlapping confidence intervals (CI) to assess for statistical significance. **RESULTS/ANTICIPATED RESULTS:** Proportions of patients with T2D who received diet or exercise counseling were no different over time: 30% in 2005 [95% CI: 25%-35%] and 25% in 2015 [95% CI: 18%-31%]. Adjusted models show Hispanic patients had higher likelihood of receiving diet or exercise counseling, compared to whites (OR: 1.38 [CI: 1.03-1.85] for diet; OR: 1.37 [CI: 1.01-1.85] for exercise), and younger age was associated with higher likelihood of diet or exercise counselling, compared to those over 75 (age 30-49, OR: 1.47 [CI:1.18-1.82] for diet OR: 1.63 [CI: 1.30-2.03] for exercise). Among provider and practice-level characteristics, metro area and type of provider were associated with higher odds of receiving any diet and/or exercise counseling with visits in a metro area (OR: 1.23 [CI: 1.03-1.48]) and with an advanced practice provider (OR: 1.77 [CI: 0.97-3.22]) having higher likelihood of receiving any diet or exercise counseling. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Up to 30% of Americans with diabetes received any diet or exercise counseling in ambulatory visits, and this remained low over a decade. There were significant differences in counseling across patient, provider, and practice characteristics. Future studies are needed to better understand what interventions might improve counseling in ambulatory settings.

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### Von Willebrand Factor is Localized in the Extravascular tissue of Patients with Juvenile Scleroderma

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**OBJECTIVES/SPECIFIC AIMS:** To further explore the role of vWF in the pathogenesis of scleroderma by identifying its location within the tissue of sample biopsies obtained as part of routine diagnosis with the use of immuno-histochemical staining. **METHODS/STUDY POPULATION:** We examined 8 skin biopsies from 2 patients with systemic sclerosis (SSc), 2 with localized scleroderma (LS) and 4 with JDM. Double immunofluorescence staining was performed in each tissue with antibodies against vWF and collagens type I and III. DAPI (4', 6-diamidino-2-phenylindole) was also used for counterstaining of inflammatory cells. Tissue staining patterns were compared between groups. **RESULTS/ANTICIPATED RESULTS:** Biopsies were obtained from the upper extremity of 7 females and the lower extremity of 1 male. Median age, symptom duration, and serum levels of vWF antigen around the time of biopsy was 8 years (IQR 4.5-11), 5.5 months (IQR 2.5-7), and 245% (IQR 203-302 for 7 patients), respectively. All but 1 biopsy was performed prior to initiation of immunosuppressive therapy. Immunofluorescence staining showed a superficial and deep perivascular inflammatory

cell infiltrate that co-localized with vWF in all tissues. There was expression of vWF in the extravascular tissue of patients with JScl co-localizing with collagen III in the reticular dermis (Figures 1 and 2). In comparison, vWF expression was restricted to the endothelium and did not co-localize with collagen in the dermis of patients with JDM (Figure 3). Patients with SSc had higher expression of vWF as compared to patients with LS. **DISCUSSION/SIGNIFICANCE OF IMPACT:** vWF may participate in the pathogenesis of cutaneous

inflammatory conditions. We have demonstrated that vWF co-localizes with cellular inflammatory infiltrates in the perivascular areas and in the dermis of patients with JScl and JDM. We additionally speculate that vWF may participate in the pathogenesis of fibrosing skin diseases based on evidence of increased extravascular expression in the tissue of patients with JScl (vs. JDM), and its co-localization with collagen. vWF expression intensity in the dermis of JScl patients may relate to disease extension (SSc vs. LS).