**Objective** Mitochondria play a pivotal role in AKI pathogenesis but the impact of mitochondrial genetic variability remains unclear. We tested the hypothesis that the development of post-cardiac bypass AKI was associated with mitochondrial haplotype – inherited variations in the mitochondrial genome that may be functionally significant.

**Design** Observational cohort study

**Setting** Single-centre, adult cardiothoracic service

**Patients** Consecutive patients were recruited, prior to elective or emergent cardiac bypass surgery. Exclusion criteria included stage 5 CKD, current AKI, planned thoracic transplantation, non-Caucasian race and subsequent off-pump surgery. Recognised AKI risk factors were recorded and AKI defined according to standard criteria. Haplogroup analysis allowed haplogroup:non-haplogroup variables to be created for the common mutations and phylogenetic supergroups (e.g. H:non-H, WXI:non-WXI). Chi-square tests for association allowed the identification of potential predictors of AKI for use in logistic regression analysis.

**Interventions** None

**Measurements and Main Results** AKI occurred in 12.8% of the study population (n=881), 69.6% of whom were male and 78.5% non-diabetic. Surgical procedures (5.8% emergent), included coronary artery bypass graft (CABG) (48.9%), valve surgery (32.6%) or a combination of the two (17.3%). Mean (SD) age was 67.1 (10.0) years, eGFR 65.9 (16.2) ml/min/1.73m2 and total bypass time 84.3 (36.5) mins. The haplotype profile included haplogroups H (42.7%), J (12.1%), T (10.9%), U (14.4%) and K (7.6%). The logistic regression model was statistically significant (χ2 = 92.695, p < 0.0005). Six variables contributed significantly to the model: age, eGFR, the presence of insulin-treated diabetes, bypass time, balloon pump use and non-CABG, non-valve procedures. None of the haplogroup:non-haplogroup pairings was a significant predictor of AKI in this model.

**Conclusions** We found no significant association between common European haplogroups and the risk of post-cardiac bypass AKI. Our observations require replication in other patient cohorts and with different aetiologies of AKI.