Insights from Wearable Biometrics After ASD Surgery: Does Wearable Biometric Data (WBD) Correlate to Complications And 30-Day Readmission better than traditional PROs?

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INTRODUCTION:

ASD surgery has been shown to provide substantial long-term benefit to patients, however many patients ask about shortterm recovery in the 4-6 weeks after surgery. Traditional PROs have failed to reliably predict post-operative course, with studies showing inconsistent results. This may reflect PROs capturing a single moment in time, whereas pain, function, and activity are dynamic processes. WBD, including motion trackers like Fitbit, provide a more comprehensive picture of physical activity. We evaluated the relationship between WBD, PROMIS Physical Function, and postoperative course after ASD surgery.

METHODS:

ASD patients were enrolled at their preoperative visit. PROMIS scores were collected and patients were provided a Fitbit to wear prior to surgery. Preoperatively, various activity metrics were recorded for a minimum of 1 week. Perioperative course and complications were recorded for 30 days after discharge, such as reoperation, DVT, dehiscence, infection, and others. Parametric and non-parametric analyses were performed to assess significance. RESULTS:

23 ASD patients were enrolled. Average fusions levels were 10.4 (SD = 3.6), all patients were fused to pelvis. 8 received all-posterior surgery and 15 received anterior-posterior surgery. 8 patients (35%) experienced perioperative complications and 3 (13%) patients were readmitted within 30-days of discharge. Patients with greater activity measured by WBD were less likely to experience complications. Between complication and non-complication groups, number of steps per activity bout was 44.5 and 81.0 (p=0.017), active time per bout was 1.78 and 2.59 (p=0.028), and number of steps per minute of activity was 23.5 and 29.1 (p=0.028) respectively (Figure 1). No difference was found for Physical Function between complication groups (p=0.104).

DISCUSSION AND CONCLUSION:

Increased preoperative activity determined by Wearable Biometric Data was associated with decreased complications, however no relationship was found with self-reported activity questionnaires. These preliminary findings suggests that WBD is superior to traditional PROs in assessing activity levels and may have utility in predicting perioperative course.



Figure 1: Box and whisker plots of activity measures in patients with and without complications