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Background and Objective

- Barbed sutures have changed the wound closure landscape by removing the need to tie knots, which leads to greater strength and security, greater consistency, and higher operating room efficiency as compared with conventional sutures.
- While several published studies have compared barbed vs. smooth sutures for wound closure using a laparoscopic surgical approach, there is an evidence gap regarding the use of STRATAFIX™ knotless tissue control devices (Ethicon, Inc.) vs. smooth sutures for wound closure in robotic surgery.
- The objective of this study was to examine the trends of use of STRATAFIX™ vs. smooth sutures for wound closure in robotic ventral hernia repair

Materials and Methods

Study Design & Data:

This retrospective, observational cohort study used discharge-level data from the Premier PINC AI™ Healthcare Data (PHD). The PHD is a US hospital-based, all-payer database that contains data on inpatient and outpatient discharge, healthcare utilization, and patient demographics, as well as detailed billing information from over 1,000 contributing hospitals.

Study Population:

Study subjects were age ≥18 years and had a surgical admission for robotic ventral hernia repair (VHR) between October 1, 2015, and June 30, 2022 (first of such admissions=index). Patients were also required to have evidence of either STRATAFIX™ or smooth suture use on the day of the procedure and their hospital must continue to contribute data to the PHD for at least 90 days post discharge.

Descriptive Statistics:

Quarterly STRATAFIX™ utilization trends as a proportion of all robotic procedures between Q4 2015 and Q2 2022.

Inferential Statistics:

Independent Variable: Use of STRATAFIX™ vs. smooth sutures for wound closure during the robotic VHR procedure.

Outcomes measured during the surgical admission: In-hospital through 90-day post-discharge wound-related complications (composite measure of surgical site infection and wound dehiscence), total hospital costs, operating room (OR) time, and 30, 60, and 90-day all-cause inpatient readmissions.

Analysis: We used 1:1 propensity score matching to balance the STRATAFIX™ and smooth suture groups on numerous patient (e.g., age, gender, race) and hospital/provider characteristics (e.g., setting of care, teaching/non-teaching, surgeon specialty). Generalized linear models (GLM), accounting for hospital-level clustering, with link functions and error distributions tailored to the empirical distribution of post-match outcomes were used to test for statistically significant differences between the STRATAFIX™ and smooth suture groups.

Results

Overall Study Population

- STRATAFIX™ utilization more than doubled in robotic VHR between Q4 2015 and Q2 2022, from 12.2% to 25.3% (Figure 1)
- Among 32,469 identified patients, after matching, 6,687 patients remained in each group (13,374 total); median age 57 years, 53.1% female
- As shown in Figure 2, the matched groups were well-balanced on matching covariates, with all post-match standardized differences equaling ≤|0.05|

Figure 1. STRATAFIX™ Trends in Robotic Ventral Hernia Repair, 2015-2022

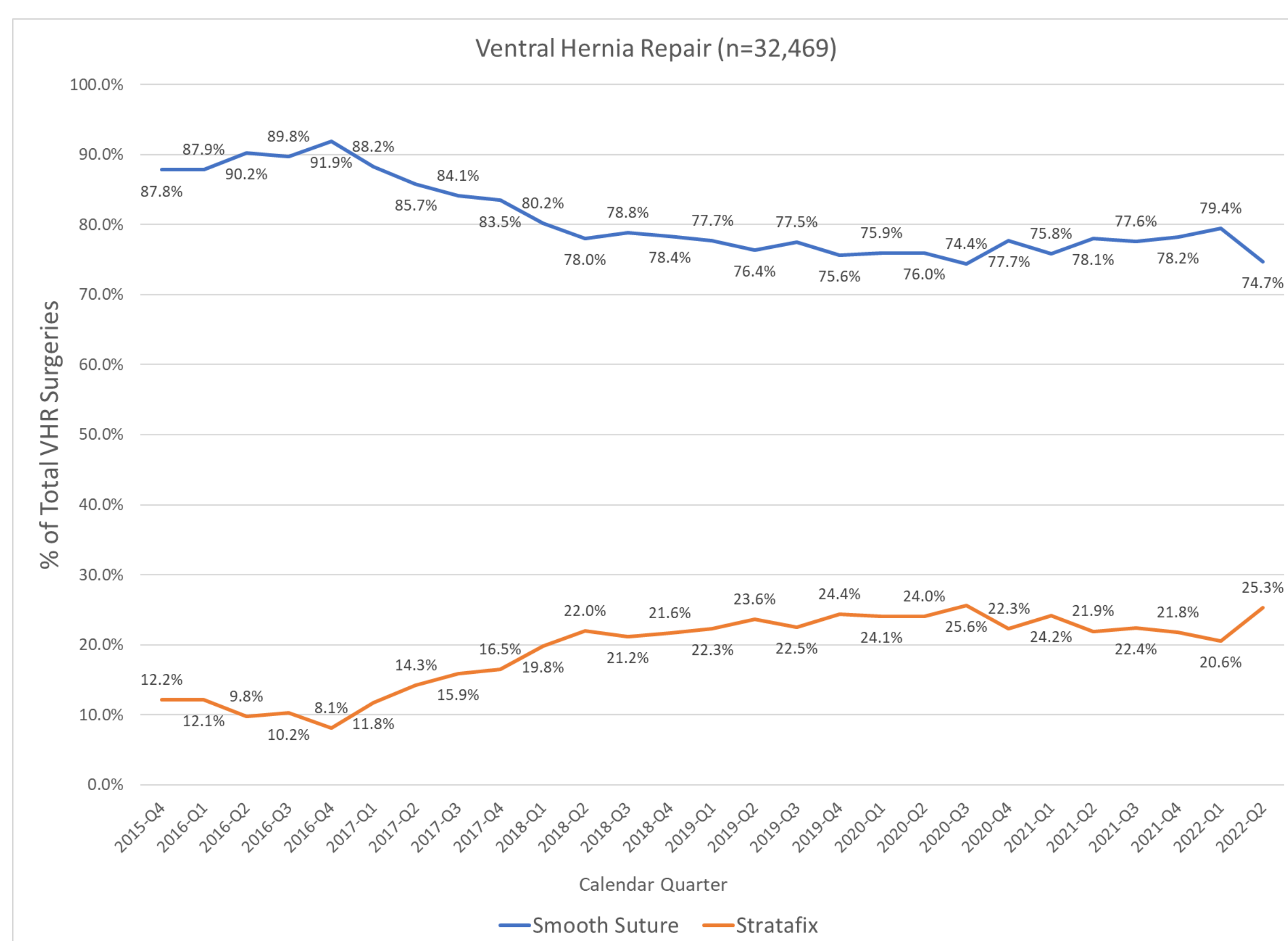


Figure 2. STRATAFIX™ / Smooth Suture Covariate Balance

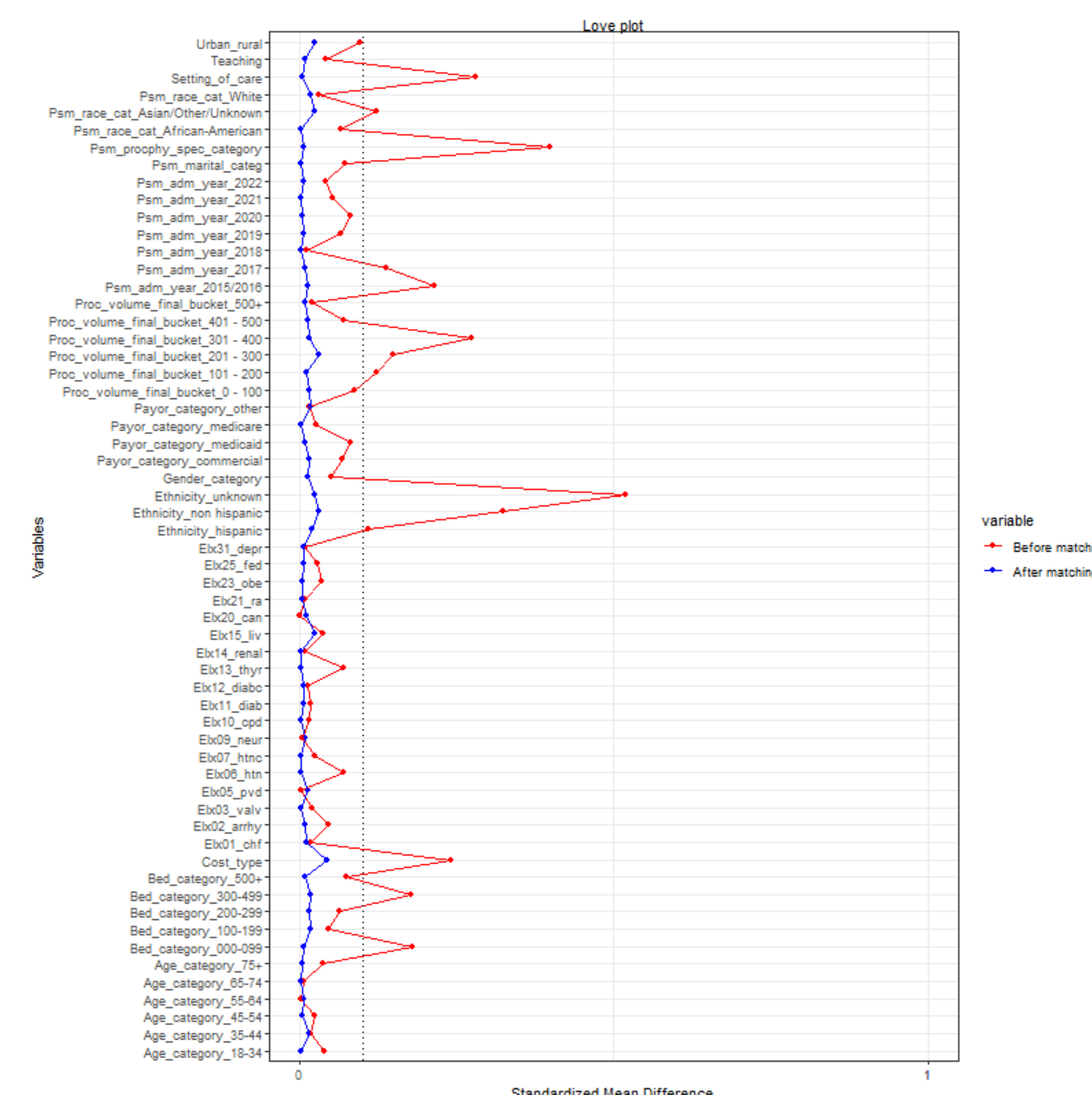


Table 1. Analysis of Outcomes

Variable	STRATAFIX™	Smooth Sutures	Mean incremental difference (95% CI)	P-value
Operating room surgical time (in minutes)	154.3	172.7	18.4 (-32.7 to -4.0)	0.012
Incidence proportion of wound-related complications*	0.91%	0.91%	0.0% (-0.34% to 0.34%)	1.000
Incidence proportion of 30-day all-cause readmissions	2.6%	3.2%	0.5% (-1.11 to 0.01)	0.095
Incidence proportion of 60-day all-cause readmissions	3.3%	3.6%	0.3% (-0.99 to 0.34)	0.332
Incidence proportion of 90-day all-cause readmissions	3.8%	4.4%	0.5% (-1.35 to 0.19)	0.137
Total hospital costs**	\$10,719	\$10,720	\$1 (-\$1,114 to \$1,112)	0.999

*Composite measure of surgical site infection and wound dehiscence
**Constant 2022 US dollars measured during the surgical admission

Table 1 illustrates the outcomes measured after matching. The observed OR time was lower in the STRATAFIX™ group as compared with the smooth suture group. The incidence of wound-related complications, all-cause readmissions at 30-, 60-, and 90-days, and total hospital costs were similar between the two suture cohorts.

Conclusions

- Adoption of STRATAFIX™ has grown substantially over the past 6 years in robotic VHR.
- While most clinical and economic outcomes were similar between the two groups, STRATAFIX™ was associated with significantly lower operating room time vs. smooth sutures.