Arteriovenous fistula creation and care in an office-based practice compared with hospital-based care

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ABSTRACT

Objective: This study evaluates and compares outcomes of arteriovenous fistulas (AVFs) created in a dialysis access-dedicated office-based laboratory (OBL) and outpatient hospital setting.

Methods: All consecutive outpatient surgical autologous AVFs created at an academic hospital, community hospital, and an OBL from 2016 to 2020 were reviewed. Demographics, comorbidities, surgical procedure, complications, maturation, patency, and procedures for maintenance were assessed from time of surgical evaluation to the latest available documentation. Complications, maturation, and patency were compared by location of surgery and postoperative access-related care, creating three groups: surgery and follow-up in hospital (hospital group), surgery in hospital and follow-up in an OBL (hybrid group), or surgery and follow-up in OBL (OBL group).

Results: We included 389 AVFs; 138 were in the hospital group, 125 in the hybrid group, and 126 in the OBL group. The median follow-up time was 34.7 months. The mean age was 59 years. Percentage of male patients was 58%. The three groups did not differ with respect to demographics and comorbidities. Peri-operative complication rate was 6.4% among 263 hospital outpatient procedures and 1.6% among 126 OBL procedures ($P = .043$). The maturation rate was lower in the hospital group (54%) than the hybrid (86%) and OBL (93%) groups, irrespective of AVF type ($P < .001$). The mean time to approval for use was 52 days in the OBL group, 66 days in the hybrid group, and 98 days in the hospital group ($P < .001$). The hospital group had the highest primary patency, but the lowest functional patency. During the follow-up period, there was a significant difference in number of procedures per year of functional patency, with 0.7 in the hospital group, 2.1 in the hybrid group, and 2.1 in the OBL group ($P < .001$).

Conclusions: Surgical AVF creation in a dialysis access-dedicated OBL is safe and associated with fewer perioperative complications, higher maturation rate, better functional patency, and lower time to approval for use as compared with patients receiving hospital-based care only. Similar results were seen among hospital created fistula patients who received subsequent care at an OBL. Dialysis access creation and care in AV Access dedicated OBLs is associated with improved outcomes as compared with hospital-based care. (J Vasc Surg 2025;81:1193-200.)

Keywords: Dialysis access; Office-based lab; Arteriovenous fistula; Cost-effectiveness; Dialysis maintenance; Elective vascular surgery

The incidence of end-stage renal disease is >100,000 cases per year and is projected to increase over the next decade.[1,2] Most patients with renal failure require vascular access for hemodialysis, with an arteriovenous fistula (AVF) being the preferred modality.[3] Elective AVF creation is now commonly performed in the outpatient hospital setting, because this procedure is safe even for medically complicated patients.[4,5] However, outpatient surgery in a hospital still carries relatively high costs as compared with other ambulatory settings, although logistical challenges such as scheduling delays or cancellations limit patient satisfaction.[6]

Office-based laboratories (OBLs) offer an alternative location to perform outpatient procedures and have been used increasingly by vascular surgeons.[7] Although OBLs are used predominantly for endovascular procedures, AVF surgery in a free-standing ambulatory surgical center has demonstrated safety.[7-9] Although there are no reports detailing the outcomes of AV access creation in an office-based setting, several reports demonstrate how these centers do improve surgeon efficiency, reduce time spent in facility for patients, and further reduce

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costs as compared with an outpatient hospital setting.[7,8] Establishment of care within an OBL may also improve ease of scheduling subsequent maintenance procedures.[10] These potential benefits could make AVF surgery and follow-up care in an office-based setting beneficial for surgeons, patients, dialysis clinics, and health care payors alike.

The purpose of this study was to compare the outcomes of outpatient surgical AVF creation and follow-up care in a hospital setting and a dialysis access-dedicated OBL.

ARTICLE HIGHLIGHTS

- **Type of Research:** Retrospective cohort study
- **Key Findings:** Comparison of creation and follow-up care in an office-based laboratory (OBL) vs a hospital setting among 389 arteriovenous fistulas (AVFs), showed greater patency, lower time to maturation, and higher maturation rates in the OBL and hybrid groups than those treated in a hospital alone, regardless of fistula type.
- **Take Home Message:** AVF creation and follow-up in a dialysis-access dedicated OBL is safe and may increase maturation rate and prolong access patency as compared with AVFs created and followed up in a hospital.

METHODS

Patient selection. All autologous AVFs created by one team of academic vascular surgeons from January 1, 2016, to December 31, 2020, were reviewed. Surgeries were performed either in an academic medical center, community medical center, or a dialysis-access dedicated OBL by one of eight surgeons. Patients were included if they underwent planned outpatient creation of a radiocephalic, brachiocephalic, two-stage brachiobasilic, or two-stage brachiobrachial AVF during the study period. Those with <4 weeks of follow-up after creation with no documented loss of patency during that period were excluded ($n = 12$). Patients were stratified into three groups by location of initial surgery and follow-up care: creation and follow-up in a hospital (hospital group), creation and follow-up in the OBL (OBL group), or creation in a hospital and follow-up in the OBL (hybrid group). Those with hospital outpatient creation were included in the hybrid group if they were seen at the OBL at least once before loss of AVF patency. All hospital-based AV access creations were performed on outpatients.

Data collection. Approval from the Rutgers University Institutional Review Board was obtained before data collection. All records were maintained prospectively and were reviewed retrospectively from preprocedural evaluation until the last available visit at all three clinical sites. Each AVF was considered individually. In patients undergoing creation of multiple AVFs during the study period, preprocedural characteristics, status of OBL follow-up, and outcomes were assessed separately for each fistula.

Records were reviewed for demographics, comorbidities at the time of surgery, preoperative medications, fistula type, anesthesia type, maturation, patency, follow-up, and survival. Specific preoperative medications of interest were antiplatelets other than aspirin, and anticoagulants. Anesthesia modality was either general, regional, or local. Regional anesthesia involved brachial plexus blockade. Local anesthesia included patients receiving conscious sedation and monitored anesthesia care.

Outcomes of interest. Primary outcomes of interest included maturation time, days from creation to approval for cannulation, patency, and survival after creation. Maturation was defined as successful two-needle cannulation for a complete session of hemodialysis among those on dialysis, or approval for AVF cannulation among those not on dialysis. Patients who were on dialysis and who were given approval for use but did not have documented cannulation, either owing to cannulation failure or loss to follow-up, were considered to have nonmature AVFs. Time to approval for cannulation was calculated only in patients who received orders from a vascular surgeon or interventional nephrologist. Approval for cannulation was granted based on postoperative fistula duplex showing a fistula with a diameter of >6 mm on ultrasound and clinically palpable robust thrill or volume flow of >600 mL/min. This practice was standard among groups. Time to first cannulation was not assessed, because the date of first cannulation was not documented routinely for most patients. Patency was compared via primary, primary-assisted, and secondary patency, which were defined as per reporting guidelines.[11]

Secondary outcomes of interest included procedural complication rate, postoperative follow-up rate, and cost of maintenance procedures. Complications of interest included 30-day mortality, unplanned admission, unplanned return to operating room (OR), reintubation, cardiac arrest, myocardial infarction, AVF failure before discharge, bleeding requiring transfusion, surgical site infection, and thromboembolic event. Rate of first outpatient postoperative visit within 21 days was calculated among all patients. Second outpatient visit rate was assessed within 70 days, excluding those with failure documented at the first visit. Maintenance cost was determined for all procedures intended to evaluate or maintain AVF patency. Maintenance cost was calculated by totaling procedures performed on fistulas after its creation. Maintenance procedures included angioplasty

Table. Operative characteristics by location

	Hospital (n = 138)	Hybrid (n = 125)	OBL group (n = 126)	*P* value
AVF types				
Brachiobasilic	23 (32)	30 (37)	17 (21)	.052
Brachiobrachial	9 (13)	7 (9)	1 (1)	.009
Brachiocephalic	33 (45)	34 (43)	44 (56)	.105
Radiocephalic	35 (48)	29 (36)	38 (48)	.288
Anesthesia modality				
General	48 (66)	56 (70)[a]	0 (0)	<.001
Regional	40 (55)	26 (32)[b]	0 (0)	<.001
Local	12 (17)	18 (23)[c]	100 (126)	<.001

AVF, Arteriovenous fistula; *OBL,* office-based laboratory.
Values are percent (number).
[a] $P = .185$ when comparing use of general anesthesia in the hospital and hybrid groups.
[b] $P = .014$ when comparing use of regional anesthesia in the hospital and hybrid groups.
[c] $P = .170$ when comparing use of local anesthesia in the hospital and hybrid groups.

(with and without stenting), percutaneous thrombectomy, collateral vein ligation and embolization, fistula ligation or banding, and open thrombectomy without revision. Costs of OBL and hospital procedures were obtained from Medicare data.

Statistics. Patency is presented via Kaplan-Meier curves with associated risk table, created using RStudio (Posit, PBC, Boston, MA). Other values are presented as a mean or median. Statistical analysis was performed with IBM SPSS Statistics version 25 (IBM, Armonk, NY) using the χ^2 test, Fisher's exact test, Student *t* test, and analysis of variance, with a *P* value of <.05 considered statistically significant.

RESULTS

We identified 389 outpatient AVF creations in 355 patients. There were 138 AVFs in the hospital group, 125 in the hybrid group, and 126 in the OBL group. The median follow-up time was 34.7 months. The median age was 59 years, and 58% of patients were male. Baseline demographics and comorbidities are presented in Supplementary Table I (online only). The groups were similar with a high rate of comorbidities. Eighty-one percent of patients (317/389) were on dialysis preoperatively, 78% (303/389) were on catheter-based dialysis, and 19% of patients (72/389) had a fistula created for anticipated use. There was a lower rate of brachiobrachial ($P = .009$) AVF creation in the OBL group, although the rates of brachiobasilic ($P = .052$), brachiocephalic ($P = .105$) and radiocephalic ($P = .288$) creation were not significantly different (Table). Average vein diameters were 3.1 mm and 3.1 mm for OBL/hybrid groups vs the hospital group, respectively ($P = .80$). The average artery diameters were 4.3 mm and 4.2 mm for OBL/hybrid groups vs the hospital group, respectively ($P = .84$). There was a significant difference in use of general ($P < .001$), regional ($P < .001$), and local ($P < .001$) anesthesia. All patients in the OBL group received local anesthesia, whereas regional anesthesia was only administered in the academic medical center. No patient required conversion from local or regional anesthesia to general. When comparing anesthesia modality in the hospital and hybrid groups, the use of regional anesthesia was significantly different (40% vs 26%; $P = .014$), but use of general (48% vs 56%; $P = .185$) and local anesthesia (12% vs 18%; $P = .170$) were not.

There were 17 patients with ≥1 complication among 263 total hospital-based creations (6.4%), and 2 patients with 1 complication among 126 OBL group creations (1.6%; $P = .043$) (Supplementary Table II, online only). There were two patients with hospital creation who suffered mortality within 30 days. One developed cardiac arrest postoperatively and another developed coronavirus disease 2019 pneumonia after discharge. One patient in the OBL group required return to OR before discharge owing to acute postoperative steal syndrome. Revision was performed in the OBL and the patient was discharged without needing transfer to a hospital. There were 13 unplanned admissions (5%) among hospital creations, whereas there were none among the OBL group ($P = .012$). Reasons for admission are demonstrated in Supplementary Table III (online only). The first outpatient visit rate within 21 days was 42% in the hospital group, 74% in the hybrid group, and 95% in the OBL group ($P < .001$). The second visit rate within 70 days was 36% in the hospital group, 75% in the hybrid group, and 83% in the OBL group ($P < .001$).

There was a significant difference in maturation rate, with 54% in the hospital group, 86% in the hybrid group, and 93% in the OBL group ($P < .001$) (Fig 1). This difference was noted even when stratifying by AVF type. There was no significant difference in the percentage of patients lost to follow-up (10% in the hybrid/OBL groups

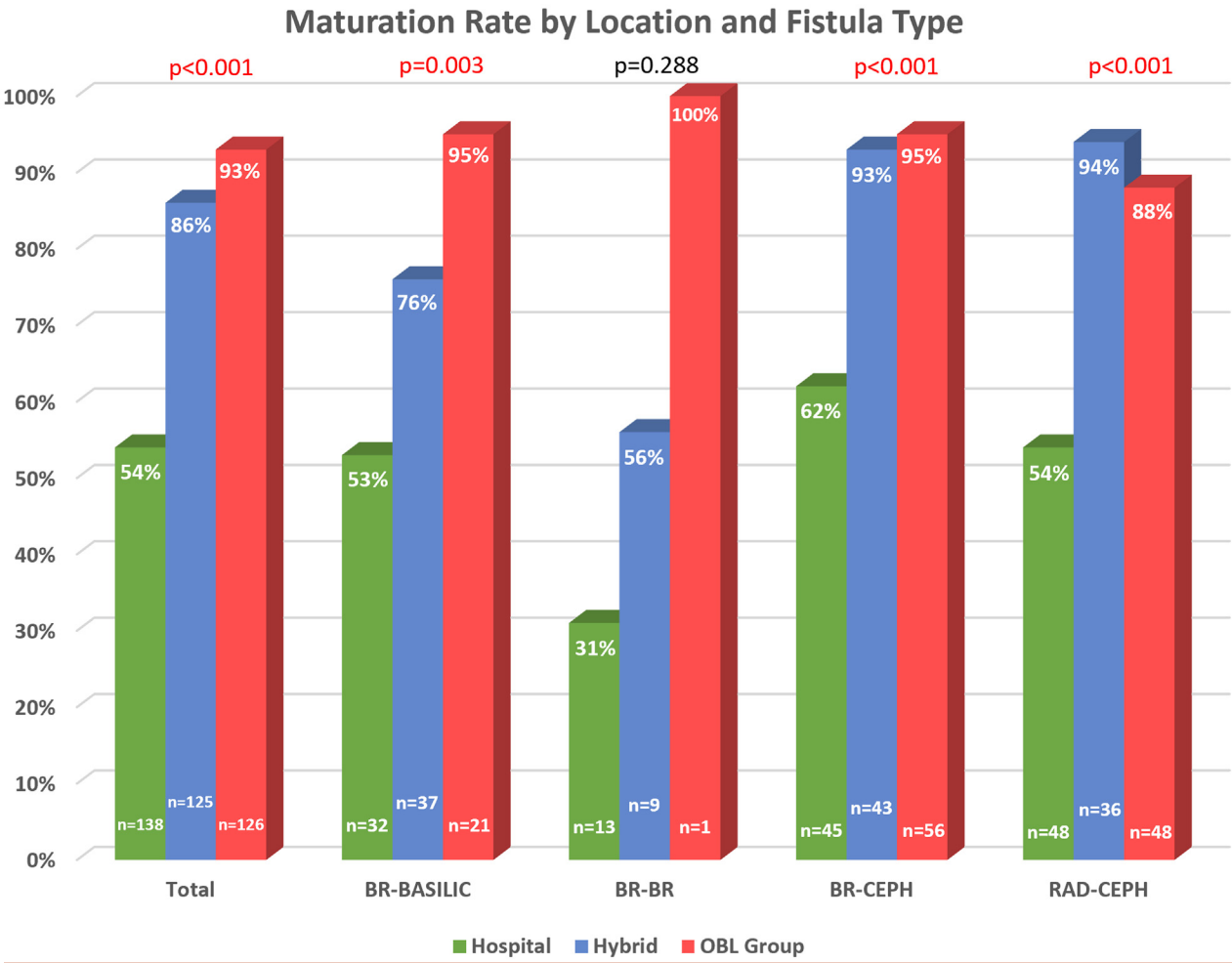

Fig 1. Maturation rates by location and stratified by fistula type. *BR*, brachio; *CEPH*, cephalic; *OBL*, office-based laboratory.

vs 13% in the hospital group $P = .72$). The mean time to approval for cannulation in the hospital, hybrid, and OBL groups was 98 days (n = 49), 66 days (n = 103), and 52 days (n = 115), respectively ($P < .001$). Primary patency was highest in the hospital group and lowest in the hybrid group ($P < .001$) (Fig 2). Primary-assisted patency was highest in the OBL group and lowest in the hospital group ($P = .013$) (Fig 3). Secondary patency was similarly high in the hybrid and OBL groups and lowest in the hospital group ($P < .001$) (Fig 4). Patient survival was similar among all three groups ($P = .266$) (Fig 5). There was a significant difference in the number of annual procedures performed, with 0.7 in the hospital group, 2.1 in the hybrid group, and 2.1 in the OBL group ($P < .001$). Annual cost of maintenance procedures was $2150.16 in the hospital group, $3838.30 in the hybrid group, and $3863.49 in the OBL group ($P = .018$).

DISCUSSION

The purpose of this study was to assess the outcomes of outpatient AVF creation and postoperative follow-up in a hospital and a dialysis access-dedicated OBL. Our results indicate that AVF creation in an OBL does not carry increased complication risks for appropriately selected patients. The OBL and hybrid groups had higher rates of maturation and secondary patency than the hospital group, which may be due to better postoperative follow-up. Patients receiving care in the OBL, regardless of creation location, underwent a higher rate of annual maintenance procedures, which also may have contributed to this difference in secondary patency. These results suggest a benefit in AVF success and longevity with care in an OBL.

Vascular surgeons use OBLs primarily for endovascular procedures, which carry a minimal risk of complication in suitable candidates.[7,12] As such, there is no literature examining surgical AVF creation in an office-based setting without access to higher levels of care available in a hospital or ambulatory surgical center. This study found a low complication rate of 1.6% among patients with OBL creation, a rate significantly lower than those with hospital creation (6.4%). Of the two OBL patients

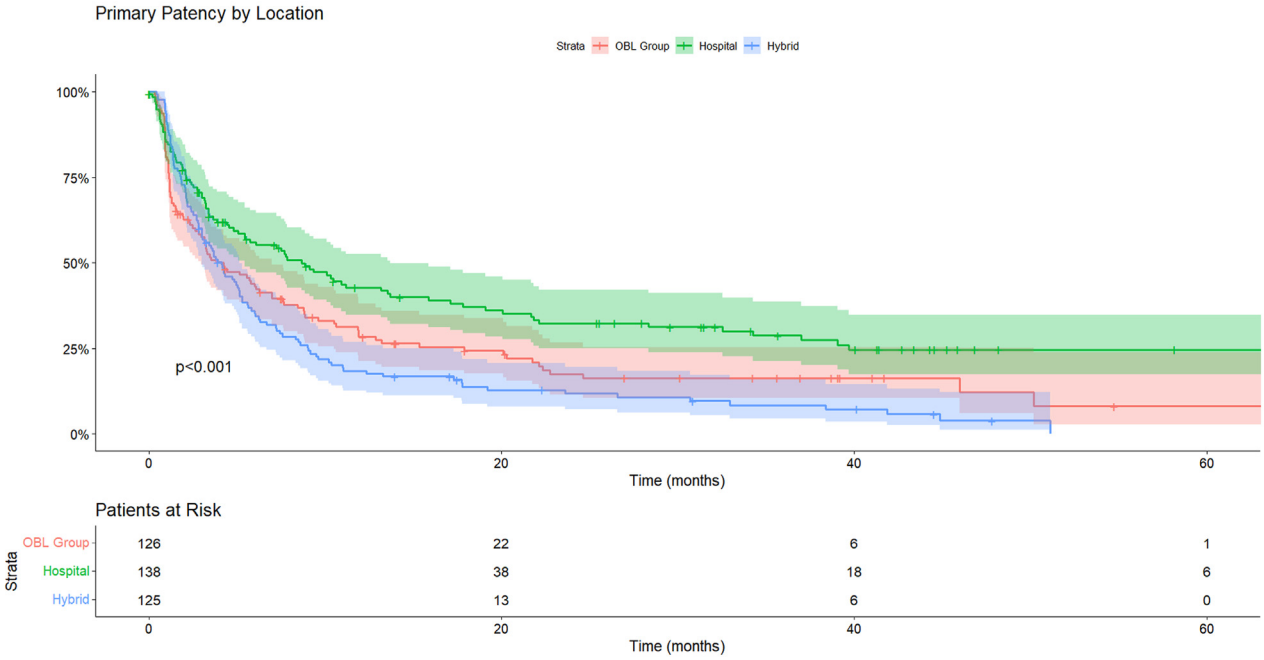

Fig 2. Primary patency by location with associated risk table. *OBL*, office-based laboratory.

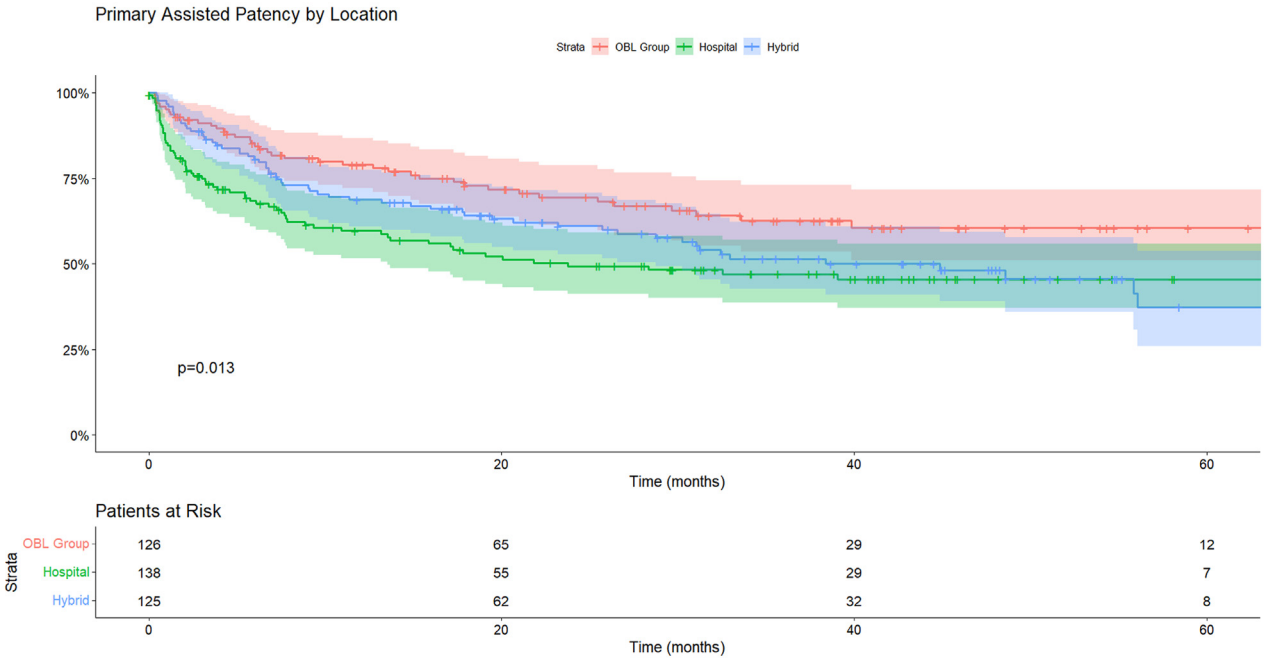

Fig 3. Primary assisted patency by location with associated risk table. *OBL*, office-based laboratory.

with a complication, only one occurred in the immediate postoperative period. This patient was able to undergo revision for acute steal syndrome in the OBL's OR and was discharged the same day without further complication. The other developed a surgical site infection that was treated with oral antibiotics. The lower complication rate in the OBL group could partially be explained by the sole use of local anesthesia. In our practice, only presence of an automatic implantable cardioverter defibrillator or pacemaker was a contraindication to surgical creation in the OBL. We felt straight local anesthesia in the OBL was even safer for the high cardiac risk patients who would otherwise have more intensive sedation by anesthesia in the hospital. We believe that all patients, regardless of comorbidities, are best treated by having their follow-up care in an outpatient center of excellence

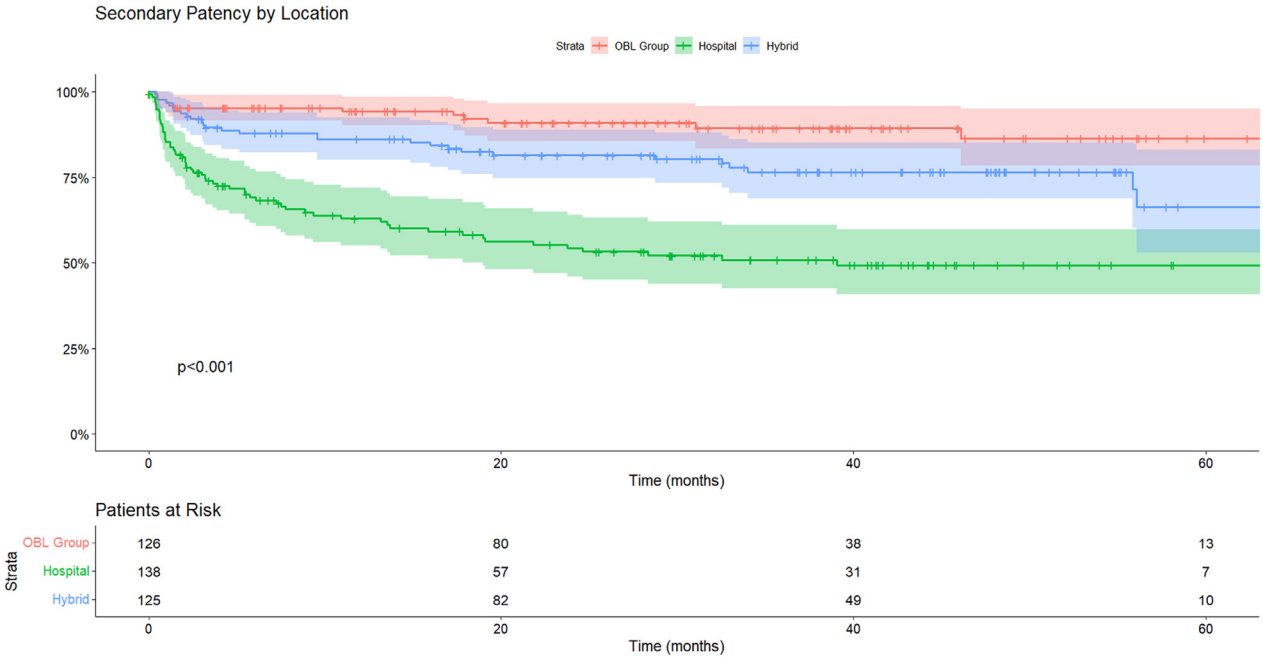

Fig 4. Secondary patency by location with associated risk table. *OBL*, office-based laboratory.

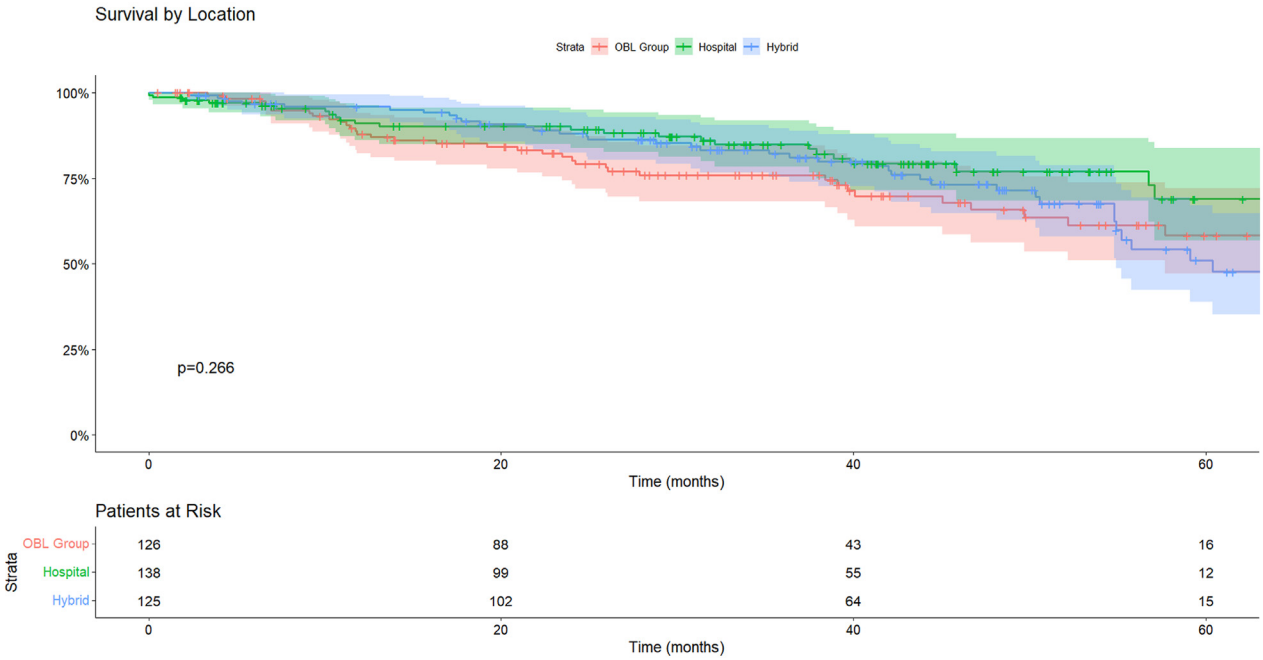

Fig 5. Survival by location with associated risk table. *OBL*, office-based laboratory.

dedicated to AV access such as this type of center. The selective use of hospital services based on medical needs is more efficient and results in better outcomes for patients on hemodialysis. AVF creation is performed commonly with general anesthesia, but available evidence suggests the complication rate with use of general anesthesia is similar, if not higher, than with local anesthesia.[13,14] Patients with chronic kidney disease have an increased baseline risk of labile blood pressure and volume status, which may be exacerbated by hemodynamic changes precipitated by general anesthesia.[15-17] Local and regional anesthesia may have comparable complication rates, although some literature identifies a lower complication risk with local anesthesia as well.[14,18] Among our patients requiring unplanned admission, one was admitted owing to airway trauma

during intubation, and two who received regional anesthesia developed prolonged arm weakness. Another developed postoperative urinary retention after general anesthesia, a complication that occurs less frequently after local anesthesia.[19] Many of the complications seen were attributable directly to use of general and regional anesthesia.[20] Thus, select patients can safely undergo AVF creation in an OBL under local anesthesia without need for hospital-level care.

The time to approval for first cannulation was also significantly different based on site of vascular access surgery. The OBL and hybrid groups had significantly shorter times to first cannulation 52 and 66 days, respectively, vs 98 days for the hospital cohort. This outcome is especially positive, given the increase in catheter prevalence in the United States since the coronavirus disease 2019 pandemic began in 2020. According to the United States Renal Data System's most recent report, "The percentage of patients with any catheter increased from 19.6% to 23.0%." Our study clearly indicated a shortened time interval to first cannulation based on the AV access cohort. Reducing catheter contact time will result in significantly fewer catheter complications, including associated blood stream infections, hospitalizations from septicemia, and subsequent central vein occlusions. The dedicated OBL focused site of service to this patient population clearly demonstrated a surrogate marker for improved outcomes.

The OBL and hybrid groups had higher rates of maturation and secondary patency than the hospital group, which is likely due to more intensive postoperative management. Patients receiving care in the OBL, regardless of location of fistula creation, underwent a higher rate of follow-up. The first outpatient visit rate within 21 days was 42% in the hospital group, 74% in the hybrid group, and 95% in the OBL group ($P < .001$). The second visit rate within 70 days was 36% in the hospital group, 75% in the hybrid group, and 83% in the OBL group ($P < .001$). This follow-up is more intensive and a likely contributor to improved outcomes, consistent with other reports.[21] In addition, patients receiving care in the OBL, regardless of location, had a higher rate of annual maintenance procedures, which likely contributed to the positive outcome disparity in secondary patency. These results suggest a benefit in AVF success and longevity when care is delivered in a focused environment.

This particular OBL solely addresses dialysis access care, whereas our hospital outpatient office manages these individuals alongside patients with other complex vascular conditions. The management of AV access in a facility with dedicated staff that communicates with dialysis centers offers improved coordination of care. This practice optimizes patient experience and likely explains the higher postoperative visit rate among those with follow-up in the OBL. All patients who followed up in the OBL underwent significantly more maintenance procedures (2.1/annum) than those with hospital-based care only (0.7/annum). Although evidence is mixed regarding whether earlier intervention in patients with thrombosed accesses improves outcomes, same-day outpatient thrombectomy typically avoids hospitalization for alternative access until an intervention is performed.[22,23] Some argue that an OBL-based vascular practice could result in performance of more procedures.[24,25] With these data showing significantly improved outcomes at a higher cost from the OBL model, this debate of maintenance strategy will be only be settled once a randomized trial comparing models is completed.

This study has several limitations. Given its retrospective nature, our results depend on the quality of available records. Patients in the hospital group had significantly poorer outpatient follow-up, and thus may have lacked proper documentation of cannulation or eventual failure. Therefore, among patients with hospital-based care only, the maturation rate may be underestimated, and patency rates may be overestimated. Our OBL received notification of death from dialysis centers, whereas hospital records may have lacked adequate survival information. Although comorbidities were overall similar in each group, there was a selection by surgeons for which patient underwent surgery in hospital vs OBL that could have resulted in an unmeasurable bias. All procedures were performed by a single surgeon at the OBL, whereas eight surgeons performed AVF creation within the hospitals; however, superior outcomes in the OBL/hybrid group over hospital group were seen in subgroup analysis for this single surgeon matching the entire cohort.

CONCLUSIONS

AVF creation and follow-up in a dialysis-access dedicated OBL is safe and may increase maturation rate and prolong access patency. These benefits with OBL-based follow-up were seen even among those with access surgery in a hospital. Thus, a dialysis access-dedicated OBL with more sophisticated care coordination may provide more patient-centered access care and increase success in AVF surgery in appropriate candidates. The effect of more frequent maintenance vascular access interventions on access longevity will best be studied through a prospective randomized trial.

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AUTHOR CONTRIBUTIONS

Conception and design: NP, GM, YY, JH, FP, SZ, WL, MC
Analysis and interpretation: NP, GM, YY, JH, FP, SZ, WL, MC
Data collection: NP, GM
Writing the article: NP, GM
Critical revision of the article: NP, GM, YY, JH, FP, SZ, WL, MC

Final approval of the article: NP, GM, YY, JH, FP, SZ, WL, MC
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REFERENCES

1. Segal M, Qaja E. Types of arteriovenous fistulas. In: *StatPearls*. StatPearls Publishing; 2022.
2. McCullough KP, Morgenstern H, Saran R, Herman WH, Robinson BM. Projecting ESRD incidence and prevalence in the United States through 2030. *J Am Soc Nephrol*. 2019;30:127–135.
3. Lok CE, Huber TS, Lee T, et al. KDOQI clinical practice guideline for vascular access: 2019 Update. *Am J Kidney Dis*. 2020;75(4 Suppl 2):S1–S164. https://doi.org/10.1053/j.ajkd.2019.12.001 [published correction appears in Am J kidney Dis. 2021 Apr;77(4):551].
4. Baker LC, Bundorf MK, Kessler DP. Competition in outpatient procedure markets. *Med Care*. 2019;57:36–41.
5. Mestres G, Yugueros X, Fontseré N, et al. Vascular access surgery can be safely performed in an ambulatory setting. *J Vasc Access*. 2019;20:195–201.
6. Al Talalwah N, McIltrot KH. Cancellation of Surgeries: Integrative review. *J Perianesth Nurs*. 2019;34:86–96.
7. Aurshina A, Ostrozhynskyy Y, Alsheekh A, et al. Safety of vascular interventions performed in an office-based laboratory in patients with low/moderate procedural risk. *J Vasc Surg*. 2021;73:1298–1303.
8. Jain K, Munn J, Rummel MC, Johnston D, Longton C. Office-based endovascular suite is safe for most procedures. *J Vasc Surg*. 2014;59:186–191.
9. Margulis R, Pedulla DJ, Bromberg AL, Choice C. Evaluation of the safety of arteriovenous fistula creation surgery in ambulatory versus inpatient hospital setting. *Saudi J Kidney Dis Transpl*. 2019;30:1295–1299.
10. Jain KM, Munn J, Rummel M, Vaddineni S, Longton C. Future of vascular surgery is in the office. *J Vasc Surg*. 2010;51:509–514.
11. Sidawy AN, Gray R, Besarab A, et al. Recommended standards for reports dealing with arteriovenous hemodialysis accesses. *J Vasc Surg*. 2002;35:603–610.
12. Lin PH, Yang KH, Kollmeyer KR, et al. Treatment outcomes and lessons learned from 5134 cases of outpatient office-based endovascular procedures in a vascular surgical practice. *Vascular*. 2017;25:115–122.
13. Son A, Mannoia K, Herrera A, Chizari M, Hagdoost M, Molkara A. Dialysis access surgery: does anesthesia type affect maturation and complication rates? *Ann Vasc Surg*. 2016;33:116–119.
14. Cole NM, Vlassakov K, Brovman EY, Heydarpour M, Urman RD. Regional anesthesia for arteriovenous fistula surgery may reduce hospital length of stay and reoperation rates. *Vasc Endovascular Surg*. 2018;52:418–426.
15. Varon J, Marik PE. Perioperative hypertension management. *Vasc Health Risk Manag*. 2008;4:615–627.
16. Kanda H, Hirasaki Y, Iida T, et al. Perioperative management of patients with end-stage renal disease. *J Cardiothorac Vasc Anesth*. 2017;31:2251–2267.
17. Li H, Xue J, Dai W, et al. Blood pressure variability and outcomes in end-stage renal disease patients on dialysis: a systematic review and meta-analysis. *Kidney Blood Press Res*. 2020;45:631–644.
18. Ismail A, Abushouk AI, Bekhet AH, et al. Regional versus local anesthesia for arteriovenous fistula creation in end-stage renal disease: a systematic review and meta-analysis. *J Vasc Access*. 2017;18:177–184.
19. Kowalik U, Plante MK. Urinary retention in surgical patients. *Surg Clin North Am*. 2016;96:453–467.
20. Mesbah Oskui P, Kloner RA, Burstein S, et al. The safety and efficacy of peripheral vascular procedures performed in the outpatient setting. *J Invasive Cardiol*. 2015;27:243–249.
21. El-Damanawi R, Kershaw S, Campbell G, Hiemstra TF. Successful restoration of arteriovenous dialysis access patency after late intervention. *Clin Kidney J*. 2015;8:82–86.
22. Khanh LN, Helenowski I, Zamor K, Scott M, Hoel AW, Ho KJ. Predictors and consequences of loss to follow-up after vascular surgery. *Ann Vasc Surg*. 2020;68:217–225. https://doi.org/10.1016/j.avsg.2020.04.061.
23. Hall D, Shaughnessy D, Drawz P, et al. Time to thrombectomy is associated with increased risk for dialysis catheter placement. *J Ren Care*. 2019;45:232–238.
24. Jones WS, Mi X, Qualls LG, et al. Trends in settings for peripheral vascular intervention and the effect of changes in the outpatient prospective payment system. *J Am Coll Cardiol*. 2015;65:920–927.
25. Boubes K, Shaikh A, Alsauskas Z, Dwyer A. New directions in ensuring catheter safety. *Adv Chronic Kidney Dis*. 2020;27:228–235.

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Additional material for this article may be found online at www.jvascsurg.org.

Supplementary Table I (online only). Baseline demographics and comorbidities by location

	Hospital (n = 138)	Hybrid (n = 125)	OBL group (n = 126)	*P* value
Demographics				
Male	58 (80)	54 (67)	62 (78)	.411
Median age at creation, years	57	61	60	.223
Race				
African American	45 (62)	56 (70)	37 (47)	
White	12 (17)	14 (18)	14 (18)	
Hispanic	40 (55)	19 (24)	25 (31)	
Other/unknown	3 (4)	10 (13)	24 (30)	
Comorbidities				
Hypertension	96 (133)	100 (125)	93 (117)	.010
Diabetes mellitus	51 (70)	66 (83)	61 (77)	.033
Coronary artery disease	27 (37)	32 (40)	31 (39)	.619
Hyperlipidemia	57 (78)	66 (83)	61 (77)	.260
Pacemaker	1 (1)	2 (3)	0 (0)	.155
ICD	2 (3)	3 (4)	0 (0)	.150
On antiplatelet other than aspirin	12 (16)	15 (19)	14 (18)	.672
On anticoagulant	9 (12)	14 (18)	6 (7)	.053

ICD, Implantable cardioverter defibrillator; *OBL,* office-based laboratory.
Values are percent (number) unless otherwise noted.

Supplementary Table II (online only). Postoperative complications by location among all planned outpatient creations, including unplanned admission

	Hospital creation (n = 263)	OBL group creation (n = 126)	*P* value
Any complication	6 (17)	2 (2)	.043
Fistula thrombosis/failure before discharge	1 (2)	0 (0)	.445
30-Day mortality	1 (2)[a,b]	0 (0)	.598
Unplanned admission	5 (13)[a,b,c]	0 (0)	.012
Unplanned return to OR	0 (0)	1 (1)[d]	.324
Re-intubation	0 (0)	0 (0)	–
Cardiac arrest	<1 (1)	0 (0)	.783
Myocardial infarction	0 (0)	0 (0)	–
Bleeding requiring transfusion	0 (0)	0 (0)	–
Surgical site infection	1 (2)	1 (1)	.219
Deep vein thrombosis or pulmonary embolism	0 (0)	0 (0)	–
Other complications	<1 (1)[e]	0 (0)	.783

OBL, Office-based laboratory; *OR,* operating room.
Values are percent (number).
[a]Includes the patient with postoperative cardiac arrest.
[b]Includes a patient with unplanned admission owing to airway trauma during intubation who later died upon re-admission owing to coronavirus disease 2019 pneumonia.
[c]Includes one patient with intraoperative fistula thrombosis with subsequent thrombectomy who was admitted owing to postoperative hyperkalemia.
[d]Owing to acute postoperative steal syndrome.
[e]Intraoperative brachial artery injury requiring reconstruction.

Supplementary Table III (online only). Reasons for unplanned admissions

Patient	Complication	Anesthesia modality	Length of stay, days
Patient A	Respiratory failure owing to pleural effusion	Regional	5
Patient B	Postoperative hypotension	Regional	2
Patient C	Hyperkalemia, medically managed	General	2
Patient D	Airway trauma during intubation	General	2
Patient E	Cardiac arrest	Regional	1
Patient F	Arm weakness owing to prolonged anesthesia	Regional	1
Patient G	Hyperkalemia requiring dialysis	Local	1
Patient H	Angioedema	General	1
Patient I	Arm weakness owing to prolonged anesthesia	Regional	1
Patient J	Postoperative hypertensive emergency	General	1
Patient K	Postoperative urinary retention	General	1
Patient L	Postoperative hypertensive urgency	Regional	1
Patient M	Malfunctioning ICD	Regional	1

ICD, Implantable cardioverter defibrillator.
All admissions occurred among planned outpatient hospital creations.