Item S1. List of papers searched

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BACKGROUND: Dependent on existing deep to superficial perforating venous branches, the WavelinQ EndoAVF System is a novel technique used to create an arteriovenous fistula (AVF) between ulnar or radial veins and concomitant arteries for dialysis access. We sought to examine a single center’s success rates and short-term follow-up using this device.

METHODS: All consecutive patients undergoing placement of a WavelinQ AVF from October 2018 to July 2019 were included. Preoperative/intraoperative variables including demographics, preoperative/postoperative duplex ultrasonography, success rate of procedure, and subsequent endovascular/surgical procedures were obtained. Descriptive statistics and comparison of groups requiring subsequent intervention were performed.

RESULTS: Thirty-five patients underwent placement of the WavelinQ AVF, with 32 (91%) patients having at least one documented follow-up. These patients were predominantly male (23/32, 72%) with an average age of 60.2 and 23 of 32 (72%) patients were on dialysis. Initial fistula creation success rate was 100%. Average procedural length was 120 min, fluoroscopy time 9.6 min, and contrast usage 52.2 mL. Eight of 32 (25%) patients had perioperative complications (3 hematomas, 3 contrast extravasations, 1 resolved vessel spasm all resolving spontaneously, and 1 pseudoaneurysm requiring surgical repair). Thirteen of 32 (41%) patients underwent subsequent endovascular interventions to assist with maturation [9/32 (28%) branch coiling, 5/32 (16%) angioplasty/stenting, and 3/32 (9%) access thrombectomy] and 4 of 32 (13%) patients required subsequent surgical interventions (1 pseudoaneurysm repair, 1 revision of fistula, and 2 definitive AVF creation in thrombosed grafts). The majority of accesses (30/32, 94%) were ulnar-ulnar fistulas and overall patency at average follow-up of 73 days was 88% (28/32) with average brachial artery inflow volume of 1,078 cc/min and average cephalic vein (18/32) outflow volume of 447 cc/min. Eleven of 23 (48%) patients on dialysis were successfully using the EndoAVF at follow-up.

CONCLUSIONS: The WavelinQ AVF system has a high initial procedural success rate, although a significant portion of patients require subsequent endovascular procedures to aid in maturation. Further work on determining factors predictive of need for reintervention is necessary. Copyright © 2020 Elsevier Inc. All rights reserved.

^https://dx.doi.org/10.1016/j.avsg.2020.05.006
In the United States, hemodialysis remains the most common treatment modality for kidney failure, chosen by almost 90% of incident patients. A functioning vascular access is key to providing adequate hemodialysis therapy. Recently, major innovations in devices and technology for hemodialysis vascular access care have rapidly changed the landscape. Novel endovascular devices for creation of arteriovenous fistulas may offer a solution to the barriers encountered in initiating maintenance hemodialysis with a permanent vascular access rather than a central venous catheter (CVC). Furthermore, in the prevalent hemodialysis population, the minimally invasive endovascular arteriovenous fistula procedure should help improve long wait times for vascular access creation, which remains a major barrier to reducing CVC dependence. Bioengineered grafts are being developed and may offer another option to polytetrafluoroethylene grafts. Early studies with these biocompatible grafts are promising, as additional studies continue to evaluate their clinical outcomes in comparison to cryopreserved or synthetic options. Prolonging the vascular access patency with appropriate use of devices such as drug-coated balloons and stent grafts may complement the novel techniques of creating arteriovenous access. Finally, innovative solutions to treat stenosed and occluded thoracic central veins can provide an approach to creating a vascular access and allow patients with exhausted vasculature to remain on hemodialysis. The robust developments in hemodialysis vascular access are likely to change practice patterns in the near future. Copyright © 2021 National Kidney Foundation, Inc. Published by Elsevier Inc. All rights reserved.
BACKGROUND: Percutaneous arteriovenous fistulas have recently proven successful alternatives to surgical arteriovenous fistulas with encouraging initial results. The Ellipsys Endovascular Arteriovenous Fistula System utilizing ultrasound and thermal energy has recently received approval for use in the United States. At the University of New Mexico, we developed an integrated service between Vascular Surgery, Interventional Radiology, and Interventional Nephrology for percutaneous arteriovenous fistulas utilizing Ellipsys.

METHODS: We performed a retrospective chart review of the initial 6 months (January 1st 2019 to July 1st 2019) of 18 percutaneous arteriovenous fistula placements to evaluate our initial technical success rate, the number of arteriovenous fistulas meeting maturation characteristics or use in dialysis, and to identify areas for quality improvement.

RESULTS: Initial technical success was achieved in 17 out of 18 arteriovenous fistulas (94.4%). Three patients did not report for any follow-up at the end of the initial 6 months. Of the remaining patients, 7 out of 15 were using their arteriovenous fistulas or meeting maturation characteristics at the end of the study (46.7%). Patient loss to follow-up/no-show (16.7%), patient not yet requiring hemodialysis (27.8%), and poor post-surgical maturation and/or need for additional maturation procedures (55.6%) were the predominate reasons for non-use. We identified improved coordination of care, early intervention, and outpatient dialysis center education as the primary areas of focus for quality improvement.

CONCLUSION: Initial technical success rate of percutaneous arteriovenous fistulas placement was comparable to published studies. Early and aggressive secondary angiographic interventions of arteriovenous fistulas failing to meet cannulation requirements, improved coordination of post-operative care, and outpatient dialysis center education appear to be the primary targets for quality improvement.
Malik et al, Kidney Medicine, “Endovascular Versus Surgical Arteriovenous Fistulas: A Systematic Review and Meta-analysis”

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^https://dx.doi.org/10.1016/j.jvs.2020.09.022

34121500


Two devices for the creation of an endovascular percutaneous (pAVF) endovascular (endoAVF) arteriovenous fistulae (AVF) are available: the Ellipsys and the WavelinQ-4F systems. The main difference is the location of the anastomosis, making it feasible to use both pAVFs and surgical Gracz-type AVF in an algorithm sequence. A 66-year-old male patient with end-stage kidney disease and HIV was referred for a creation of a dialysis access after failed peritoneal dialysis. A radial-radial WavelinQ-pAVF with simultaneous coil embolization of a brachial vein was created but failed within 4 weeks. Therefore, an Ellipsys-pAVF was successfully created between the proximal radial artery and perforating vein on the same arm. After 2 days, however, the Ellipsys-pAVF anastomosis occluded. The ipsilateral Gracz-AVF was created, anastomosing perforating vein with the antecubital brachial artery. Cannulations were started 28 days later. During the follow up of 807 days, the AVF remained patent with last known volume flow of 1500 ml/min and no need for secondary interventions. We report a successful creation of a Gracz-AVF after primary failed pAVFs created with both pAVF-systems in a single patient and in the same arm. Thus, based on that case we recommend creation of pAVF prior to Gracz-AVF as integral part of Vascular Access creation algorithm, based on each patient’s life plan.

^https://dx.doi.org/10.1177/11297298211021339
RATIONALE & OBJECTIVE: Percutaneous arteriovenous fistulas (AVF) are created by establishing a proximal forearm anastomosis and offer a safe and reliable vascular access. This study compares the Ellipsys percutaneous AVF with a proximal forearm Gracz-type surgical AVF, chosen for comparison as it is constructed at the same anatomical site.

STUDY DESIGN: Retrospective study of prospectively collected clinical data.

SETTING & PARTICIPANTS: All vascular access procedures conducted during a 34-month period were reviewed. The study groups comprised 89 percutaneous AVFs and 69 surgical AVFs.

EXPOSURE: Percutaneous or surgical AVF placement.

OUTCOME: AVF patency, function, and complications.

ANALYTICAL APPROACH: Patency rates for each AVF group were evaluated by competing risk survival analysis using a cumulative incidence function. Association of primary, primary assisted, and secondary patency with the AVF groups was examined by Cox proportional hazard models.

RESULTS: Technical success was 100% for both groups. Average procedure times were 14 minutes for percutaneous AVFs and 74 minutes for surgical AVFs (P < 0.001). Proximal radial artery (PRA) was used in all percutaneous AVF cases. Inflow for surgical AVFs included radial (30%), ulnar (12%), and brachial (58%) arteries. Outflow veins for both groups were the cephalic and/or basilic veins. Access flow volumes, times to maturation, and overall numbers of interventions per patient-year were not significantly different. Cumulative incidence of primary patency failure at 12 months was lower for surgical AVF (47% vs 64%, P = 0.1), but secondary patency failure was not different between groups (20% vs 12%, P = 0.3). PRA surgical AVFs had similar primary patency (65% vs 64%, P = 0.8) but higher secondary patency failure rates than percutaneous AVFs at 12 months (34% vs 12%, P = 0.04).

LIMITATIONS: Retrospective study with a relatively short follow-up period, and not all patients required hemodialysis at the end of study.

CONCLUSIONS: Both percutaneous and surgical AVFs demonstrated high rates of technical success and secondary patency. Percutaneous AVFs required shorter procedure times. The rate of intervention was similar. When a distal radial artery AVF is not feasible, percutaneous AVF might offer an appropriate procedure for creating a safe and functional access, maintaining further proximal forearm surgical AVF creation options. Copyright © 2021 The Authors. Published by Elsevier Inc. All rights reserved.

^https://dx.doi.org/10.1053/j.ajkd.2021.01.011
INTRODUCTION: Surgically created arteriovenous fistulas are the accepted gold standard for the establishment of hemodialysis access in patients requiring dialysis. However, primary and maturation failures may limit their usage. Recent advances in endovascular technology have resulted in the creation of devices for endovascular arteriovenous fistula formation. These devices may offer an additional or alternative approach to fistula formation in patients with end-stage kidney disease.

AREAS COVERED: This review describes the limitations of surgical arteriovenous fistulas and the endovascular devices currently available. The review covers initial trial data and subsequent studies examining their use.

EXPERT OPINION: Early results achieved with endovascular fistula formation are encouraging. Current limitations of this technology include anatomic suitability and a high rate of re-interventions required to establish maturity. Greater uptake of the technology will also require a review of long-term outcomes in larger patient cohorts.
OBJECTIVES: The aim of the present study was to perform cost-effectiveness and budget impact analyses comparing endovascular arteriovenous fistula creation to surgical arteriovenous fistula creation in hemodialysis patients from the National Healthcare Service (NHS) perspective in Italy.

METHODS: A systematic literature review has been conducted to retrieve complications’ rates after arteriovenous fistula creation procedures. One study comparing endovascular arteriovenous fistula creation, performed with WavelinQ device, to the surgical approach through propensity score matching was preferred to single-arm investigations to execute the economic evaluations. This study was chosen to populate a Markov model to project, on a time horizon of 1 year, quality adjusted life years and costs associated with endovascular arteriovenous fistula (WavelinQ) and surgical arteriovenous fistula options for both cohorts of incident and prevalent hemodialysis patients.

RESULTS: For both incident and prevalent hemodialysis patients, endovascular arteriovenous fistula creation, performed with WavelinQ, was the dominant strategy over surgical arteriovenous fistula approach, showing less cost and better patients’ quality of life. Compared to the current scenario, progressively increasing utilization rates of WavelinQ over surgical arteriovenous fistula creation in the next 5 years in incident hemodialysis patients are expected to save globally 30-36 million euros to the NHS.

CONCLUSION: Endovascular arteriovenous fistula creation performed with WavelinQ could be a cost-saving strategy in comparison with the surgical approach for patients in hemodialysis. Future studies comparing different devices for endovascular arteriovenous fistula creation versus the surgical option would be needed to confirm or reject the validity of this preliminary evaluation. In the meantime, decision-makers can use these results to take decisions on the diffusion of endovascular procedures in Italy.

^https://dx.doi.org/10.1177/1129729820921021

33068764


OBJECTIVE: The Food and Drug Administration recently approved two percutaneous arteriovenous fistula creation systems: the Ellipsys vascular access (EL) system and WavelinQ EndoAVF (WQ) system. Although the initial clinical trials of each system have demonstrated a high success rate, little detail on anatomic suitability was provided. We sought to determine the real-world applicability of the EL and WQ systems by studying them in a single representative cohort.
METHODS: All patients receiving a first-time arteriovenous access consultation at a single Veterans Affairs institution underwent extensive vein mapping of the bilateral upper extremities. Anatomic suitability was assessed in accordance with the manufacturer’s instructions for use (IFU), and clinical usability was determined using additional published anatomic guidelines. The suitability for radiocephalic fistula (RCF) creation was also assessed. To estimate how often these systems would be used in practice, a clinical algorithm was created, with a preference for RCF creation, followed by percutaneous arteriovenous fistula (pAVF) creation, surgical fistula creation at the elbow, and, finally, graft placement.

RESULTS: During the study period, 116 upper extremities were measured in 58 male patients. Per the IFU, the rate of extremity suitability was 93% and 52% for the WQ and EL systems, respectively (P < .0001). In the same population, 32% of the extremities had acceptable anatomy for RCF creation. The overall clinical usability of these systems using more recent published guidelines was 55% for the WQ system and 44% for the EL system (P = .09). The usability of both pAVF systems was most limited by the size of the deep perforating cubital vein. The proximity of the antecubital perforator vein and proximal radial artery additionally limited EL usability. Based on the clinical algorithm, initial access creation would have been RCF creation for 31% of the cohort, followed by the WQ (32%), the EL (23%), surgical fistula creation at the elbow (18%), and graft placement (17%).

CONCLUSIONS: Anatomic suitability was greater for WQ than for EL when considering only the IFU. Once the full requirements for pAVF creation were considered, we found no significant differences in usability between the two systems. Anatomic analysis showed that pAVF creation can constitute a substantial part of a hemodialysis access practice. Copyright © 2020 Society for Vascular Surgery. All rights reserved.
frequency of postoperative interventions to facilitate maturation. Second, to contribute toward the evidence-based incorporation of the pAVF procedure into the hemodialysis access algorithm.

METHODS: A single-center retrospective review was performed on all consecutive patients undergoing surgically created brachiocephalic arteriovenous fistula (BC-AVF, sAVF group) from January 1, 2018 to December 31, 2018 and Ellipsys-created percutaneous arteriovenous fistula (pAVF group) from January 1, 2019 to December 31, 2019. Comparative analysis between groups was performed.

RESULTS: A total of 24 patients underwent Ellipsys-created pAVF with mean age of 56.7 +/- 22.6 years (12 males [50%], 12 females [50%]) and 62 patients underwent surgically created BC-AVF with mean age of 62.5 +/- 13.2 years (32 males [52%], 30 females [48%]). Both the pAVF and sAVF groups had comparable mean operating times (60 +/- 40 vs. 56 +/- 25 min, P=0.67) and frequency of procedural technical success (23 [96%) vs. 62 [100%), P=0.28), respectively. The pAVF group had a lower clinical maturation rate (12 [52%] vs. 54 [87%], P=0.003) and a higher primary failure rate (9 [39%] vs. 6 [10%), P=0.003) when compared to the sAVF group. The pAVF group had an increased overall rate of undergoing a postoperative intervention (18 [78%] vs. 13 [21%], P< 0.001), as well as an increased number of total postoperative interventions (1.1 +/- 0.9 vs. 0.3 +/- 0.6 interventions, P< 0.001) compared to the sAVF group. Percutaneous transluminal angioplasty of the juxta anastomotic segment was the most prevalent postoperative intervention performed in the pAVF group and occurred at a significantly increased frequency when compared to the sAVF group rate (13 [57%] vs. 5 [8%], P< 0.001).

CONCLUSIONS: In our single-center retrospective review, patients undergoing Ellipsys-created pAVF in the first year following introduction of percutaneous endovascular had inferior rates of clinical maturation and underwent more postoperative interventions when compared to historical patients undergoing surgically created BC-AVF. Outcome discrepancies compared to previously reported Ellipsys data demonstrate a need for further studies examining the practical translatability of the pAVF. Copyright © 2021 Elsevier Inc. All rights reserved.

^https://dx.doi.org/10.1016/j.avsg.2020.12.041


32597355

BACKGROUND: The first arteriovenous fistulas were created at the wrist more than 60 years ago. Basic surgical construction techniques remain unchanged with mobilization and repositioning of the vessels followed by a sutured anastomosis. We used the Ellipsys device to construct percutaneous radiocephalic-arteriovenous fistulas at the wrist and report the results.

METHODS: Data were reviewed retrospectively for all patients who had a percutaneous radiocephalic-arteriovenous fistula created during a 6-month period. Each individual underwent ultrasound vessel mapping in addition to physical examination. When a radiocephalic-arteriovenous fistula was feasible and a communicating vein 2 mm in diameter was noted in the distal forearm along with a radial artery 2 mm, a percutaneous radiocephalic-arteriovenous fistula was considered and reviewed with the patient.

RESULTS: Four individuals met the criteria to consider a percutaneous radiocephalic-arteriovenous fistula and all elected to have the procedure performed. Ages were 54-85 years. Three were diabetic and one was female. All percutaneous radiocephalic-arteriovenous fistulas were technically successful. Two individuals had not yet started dialysis therapy. Successful and repetitive cannulation for the two individuals with catheters was initiated at 4 and 8 weeks post procedure. The two predialysis patients had physiologic arteriovenous fistula maturation (6 mm vein diameter and >500 mL/min flow) at 4 and 12 weeks. There were no procedural or late complications and none required intervention. Follow-up was 8-23 months (mean 16 months).

CONCLUSION: The success of these percutaneous radiocephalic-arteriovenous fistulas suggests that use of the Ellipsys device will be applicable at the wrist in selected patients where appropriate vessel sizes and configurations are found.

https://dx.doi.org/10.1177/1129729820933737

32597359


OBJECTIVE: We evaluate the creation of a percutaneous proximal radial artery-radial vein arteriovenous fistula with Ellipsys R instead of the usual first-stage brachial artery fistula prior to a second-stage brachial vein elevation, in patients with inadequate cephalic and basilic veins.

METHODS: Single center study of eight patients (six males, mean = 54 years) who underwent a two-stage brachial vein elevation procedure between May 2017 and October 2019. Inclusion criteria were life expectancy > 6 months, patent brachial and proximal radial artery (>2 mm in diameter)
absent/inadequate cephalic and basilic veins, existence of a brachial vein >3 mm in diameter, and in continuity with a proximal radial vein > 2 mm in diameter.

RESULTS: Technical success was 100%. Four patients required angioplasty of a juxta-anastomotic stenosis, accounting for a 6-month primary and secondary patency rates were 68% and 100%, respectively. Access flow averaged 982 mL/min (range 768-1586) at final follow-up evaluation. There were no significant adverse events related to the procedures. All fistulae were elevated at 4-12 (mean: 8) weeks post creation and were successfully cannulated with two needles after healing was completed (2-4 weeks after elevation). No patients developed hand ischemia or arm edema.

CONCLUSIONS: Percutaneous creation of a proximal radial artery-radial vein fistula followed by brachial vein elevation is a safe and reliable option for autogenous access creation in patients with inadequate cephalic or basilic veins. Minimally invasive radial artery inflow and longer available length of the targeted brachial vein available for elevation are the main advantages in skilled hands.

https://dx.doi.org/10.1177/1129729820936921

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This retrospective, single center, case report describes the first use of the Ellipsys Vascular Access System for percutaneous arteriovenous fistula (pAVF) creation in children. Two adolescent (<20 year of age) patients (18 and 19-year-old females), one of whom was developmentally delayed, were not considered candidates for traditional surgical arteriovenous fistula creation. pAVF creation was successful in both patients using the Ellipsys device and physiologic maturation of the fistula was achieved within 8 weeks of creation with subsequent 2 needle cannulation. No complications or adverse events were encountered. pAVF creation with the Ellipsys device can be safely performed in adolescents. Further studies will be needed to validate the expanded use of these devices in children. Copyright © 2020 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

https://dx.doi.org/10.1016/j.radcr.2020.12.026
Preoperative assessment prior to surgical arteriovenous fistulas (AVFs) including ultrasound-guided mapping has been shown to have beneficial effects on their immediate success as well as early outcomes. This has led to their wide acceptance and adoption however clinical practice criteria is variable and is reflected in variabilities in practice. When transposing this to percutaneously created endovascular AVFs (endoAVFs), variable preoperative assessment criteria could equally result in variable practice and potentially subsequent and expectant outcomes. We aimed to review literature on reported validated methodologies and workflows of preoperative assessment for surgical AVF creation as reported in highest levels of available evidence, specifically randomized controlled trials. Published practice recommendations and guidelines on best clinical practice as well as systematic reviews and meta-analyses of published studies were also reviewed. Data on practice methodology from identified trial publications and protocols was collated and a summative narrative synthesis was carried out which compared these methodologies to additional assessments that may be required when targeting assessment for percutaneous endoAVF formation, based on our units experience as part of an international multicentre trial. In this review we present a brief overview of published literature and guidelines and propose a unified and uniform workflow for preoperative assessment for surgical AVFs and endoAVFs to aide clinical and imaging practice. Copyright © The Author(s) 2019. Published by Oxford University Press on behalf of ERA-EDTA.


Percutaneous endovascular arteriovenous fistula (Endo-AVF) is a minimally invasive alternative to conventional surgical dialysis access. Endo-AVF may represent a significant advance in the creation of dialysis access but may require a variety of additional procedures to achieve adequate flow. To
maximize flow through the cephalic vein, usually the preferred vessel, it may be necessary to permanently occlude competing outflow branches such as the brachial or basilic vein. Ultrasound monitoring of cephalic vein flow in the vascular lab can be used to predict the efficacy of basilic vein ligation but requires 2 operators to perform. We developed a simple technique to temporarily obstruct basilic vein outflow using a standard dialysis clamp that can be performed by a single vascular technologist. With the patient in the supine position, the spring-loaded dialysis clamp is positioned over the basilic vein in the upper arm using ultrasound guidance. The clamp applies mild, painless obstruction of the basilic vein without interfering with arterial inflow or cephalic vein outflow. Cephalic vein peak systolic velocity, intraluminal diameter, and flow volume are recorded. This technique was used in 6 patients, 4 to 6 weeks, following the initial Endo-AVF procedure. Ultrasound surveillance confirmed that the basilic vein outflow was effectively occluded in all 6 cases. The same ultrasound machine was used in all 6 studies. Cephalic vein flow increased significantly in each case (pre-clamp cephalic flow volume 301 +/- 66.8 mL/min vs post-clamp 702 +/- 156.5 mL/min after, P = 1.0). Ultrasound observation of the basilic vein post-clamp application concluded there were no complications related to the use of the dialysis clamp. The average duration of the procedure was less than 20 minutes. We have successfully developed a simple non-invasive technique to predict the effect of basilic vein occlusion on cephalic vein flow that can be accomplished by a sole vascular technologist. This technique can be used to guide the need for embolization of the basilic vein. Copyright © 2021, Society for Vascular Ultrasound.


OBJECTIVE: The aim of the present study was to compare the results between percutaneous arteriovenous fistulas (p-AVFs) created with the Ellipsys device (Ellipsys Vascular Access System; Avenu Medical, San Juan Capistrano, Calif) and surgical arteriovenous fistulas (s-AVFs).

METHODS: A single-center retrospective comparative study of the first 107 patients who had undergone p-AVF creation with the Ellipsys system from May 2017 to May 2018 with an equal number of consecutive patients who had undergone s-AVF creation in our center during the same period. The primary endpoints included the maturation and patency rates. The secondary endpoints were reintervention, risk of infection, and the incidence of steal syndrome and aneurysm formation.
RESULTS: The demographic, hypertension, and diabetes data were similar for both groups. The only difference between the two groups was that more p-AVF patients had already been receiving hemodialysis (61% vs 47%; P < .05). The p-AVFs showed superior maturation rates at 6 weeks (65% vs 50%; P = .01). The primary patency rates were greater for the s-AVFs at 12 months (86% vs 61%; P < .01). However, primary patency was comparable between the two groups at 24 months (52% vs 55%; P = .48). No significant difference was found in the secondary patency rates at 12 (90% vs 91%) and 24 (88% vs 91%) months. At the 2-year follow-up point, the rate of percutaneous reintervention was similar; however, the s-AVFs had required more frequent surgical revision (36% vs 17%; P = .01). Issues with wound healing and infection were also more frequent with s-AVFs (9% vs 0.9%; P < .01).

CONCLUSIONS: Fistulas created percutaneously with the Ellipsys system showed superior maturation rates and similar patency with s-AVFs created in an experienced high-volume vascular surgery practice. p-AVFs had a lower risk of wound healing issues, infection, and surgical revision. Larger, prospective, randomized multicenter studies are needed to confirm these findings. Copyright © 2021 The Authors. Published by Elsevier Inc. All rights reserved.

https://dx.doi.org/10.1016/j.jvs.2020.12.086

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https://dx.doi.org/10.1016/j.jvir.2020.12.022

31564584

OBJECTIVE: The percutaneous endovascular approach to arteriovenous fistula (AVF) creation is a minimally invasive alternative to surgical AVF creation. This systematic review and meta-analysis aimed to investigate the efficacy and safety of endovascular AVF creation in patients with end-stage renal disease.

METHODS: This study conformed to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. An electronic search was performed on major databases to identify relevant articles. Meta-analysis of proportions and meta-regression were conducted.

RESULTS: Seven studies totaling 300 patients were included, of which four evaluated the everlinQ (TVA Medical, Austin, Tex) and three employed the Ellipsys (Avenu Medical, San Juan Capistrano, Calif) systems. The overall technical success rate was 97.50% (95% confidence interval [CI], 94.98-99.31%; I² = 0.00%; P = .487). The 90-day maturation rate was 89.27% (95% CI, 84.00-93.66%; I² = 21.29%; P = .283), and the 6-month patency and 12-month patency were 91.99% (95% CI, 87.98-95.35%; I² = 0.00%; P = .780) and 85.71% (95% CI, 79.90-90.71%; I² = 0.00%; P = NS), respectively. The overall procedure-related complication rate was 5.46% (95% CI, 0.31-14.42%; I² = 81.21%; P = .000). Meta-regression was conducted on the pooled rates of technical success and complication, showing that age, diabetes, white race, hypertension, on dialysis, and body mass index were not significant sources of heterogeneity.

CONCLUSIONS: Current endovascular AVF systems appear to be effective and safe. However, given the lack of head-to-head comparative analyses with surgical AVF creation, superiority cannot be established. Copyright © 2019 Society for Vascular Surgery. Published by Elsevier Inc. All rights reserved.

^https://dx.doi.org/10.1016/j.jvs.2019.07.057

31782685


End-stage kidney disease patients who are candidates for surgical arteriovenous fistula creation commonly experience obstacles to a functional surgical arteriovenous fistula, including protracted wait time for creation, poor maturation, and surgical arteriovenous fistula dysfunction that can result in significant patient morbidity. The recent approval of two endovascular devices designed to create a percutaneous arteriovenous fistula enables arteriovenous fistula creation to be placed in
the hands of interventionalists, thereby increasing the number of arteriovenous fistula providers, reducing wait times, and allowing the patient to avoid surgery. Moreover, current studies demonstrate that patients with percutaneous arteriovenous fistula experience improved time to arteriovenous fistula maturation. Yet, in order to realize the potential advantages of percutaneous arteriovenous fistula creation within our hemodialysis patient population, it is critical to select appropriate patients, ensure adequate patient and dialysis unit education, and provide sufficient instruction in percutaneous arteriovenous fistula cannulation and monitoring. In this White Paper by the American Society of Diagnostic and Interventional Nephrology, experts in interventional nephrology, surgery, and interventional radiology convened and provide recommendations on the aforementioned elements that are fundamental to a functional percutaneous arteriovenous fistula.

https://dx.doi.org/10.1177/1129729819889793


BACKGROUND: Sixty years after the first description of Scribner-shunt, and 54 years after publication of the first radio-cephalic arterio-venous fistula (AVF), endovascular percutaneous AVF (pAVF) was introduced. We report a successful case of Ellipsys-pAVF creation and use for hemodialysis in a patient with a previous ipsilateral Scribner-shunt.

CASE: A 72-year old female patient with chronic kidney disease (CKD), previous right-sided Scribner-shunt and kidney transplant, underwent a successful creation of right-sided Ellipsys-pAVF. The procedure time was 12 min with intraoperative brachial artery volume flow of 720 ml/min. At 39 days, an ultrasound-guided balloon-angioplasty of the outflow cephalic vein stenosis was performed. Cannulations were started 41 days after the creation of pAVF. No additional interventions were required during the follow-up of 258 days with last follow-up volume flow of 1400 ml/min.

CONCLUSIONS: This is the first report of the creation of pAVF in a patient with previous “traumatic” ipsilateral placement of a Scribner-shunt. It allows the creation of a small anastomosis in very short time, which can be successfully used for hemodialysis treatment on the same day, if necessary, and reduces the expected risk of high-flow AVF with associated peripheral steal and cardiac outcomes (especially in a patient with cardiomyopathy such this one).

^https://dx.doi.org/10.1177/1129729820969323

Purpose: The purpose of this study was to compare the clinical outcomes of Ellipsys with those of WavelinQ-4F percutaneous arteriovenous fistulae (pAVF) devices in a single center by a single operator.

Materials and Methods: A retrospective review was conducted in 100 patients who underwent pAVF procedures (65 Ellipsys and 35 WavelinQ patients) and created between December 2017 and December 2019. A total of 69% were male and 37% were diabetic. Median age was 64.1 years (range: 28-86), and median body mass index was 27.2 (range: 15-45.1) kg/m2. A procedure sequence algorithm was followed for selecting all vascular accesses created.

Results: Ellipsys outcomes were compared to WavelinQ outcomes. Technical success was 100% versus 97%, respectively, and median procedure times were 14 versus 63 minutes, respectively (P < .001), with 183 (1-487) versus 185 (0-760) days follow-up, respectively. Maturation at 4 weeks was 68.3% versus 54.3%, respectively, and median times to cannulation were 60 (1-164) versus 90 (1-180) days, respectively. Successful pAVF dialysis was established in 31 of 39 patients (79.5%) versus 14 of 24 patients (58%), respectively (P = .071), dialysis patients with access-related adverse events observed in 4 individuals (1 Ellipsys versus 3 WavelinQ). Six patients (5 versus 1) with matured outflow from previous AVFs underwent first-day cannulations. Interventions were performed in 27.7% (33 Ellipsys) and 26.5% (15 WavelinQ) patients, and the number of interventions per patient-years was 0.96 versus 0.46, respectively. pAVF failure was seen in 15.4% versus 37.1% patients, respectively (P = .0137). Secondary patency at 12 months was significantly higher among patients who had an Ellipsys procedure (82%) than among those who underwent the WavelinQ procedure (60%).

Conclusions: pAVFs were created with high technical success and low complications with both devices. Ellipsys pAVFs demonstrated significantly shorter procedure times without a need for radiation exposure and with superior secondary patency. Copyright © 2020 SIR. All rights reserved.

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^http://dx.doi.org/10.1016/j.jvscit.2020.05.015
http://www.jvasccases.org/


2005241818


^http://dx.doi.org/10.1016/j.jvs.2020.01.034
https://www.journals.elsevier.com/journal-of-vascular-surgery


32276012

OBJECTIVE: The aim of this study was to report our midterm results of percutaneous arteriovenous fistula (pAVF) creation using the Ellipsys (Avenu Medical, San Juan Capistrano, Calif) device and to present technical recommendations and our algorithm of pAVF maintenance.

METHODS: A single-center comprehensive database of all consecutive predialysis and end-stage renal disease patients who had a pAVF creation with the Ellipsys device was reviewed retrospectively. Study end points included technical success, maturation, functional patency, and required interventions.

RESULTS: Between May 2017 and July 2019, there were 234 patients (mean age, 64 years; 148 male [63%]) who had a pAVF created. Technical success was achieved in 232 individuals (99%), and average duration of the procedure was 15 minutes (7-35 minutes). Average follow-up was 252 days (range, 83-696 days). The 1-year primary, primary assisted, and secondary patency rates were 54%, 85%, and 96%, respectively. Average pAVF flow was 923 mL/min (range, 425-1440 mL/min). There were no significant adverse events related to the procedure. Only three patients (1%) required a later conversion of the pAVF anastomosis to a surgical fistula. Twenty-four (10%) patients required superficialization of deep outflow veins because of difficult cannulation. Average maturation time was 4 weeks (range, 1-12 weeks). Fourteen patients (6%) had early (<2 weeks after creation) cannulation of the pAVF.

CONCLUSIONS: The Ellipsys pAVF device allows the rapid and safe creation of a reliable autogenous access. Rates of technical success, patency, and maturation were excellent. For patients unsuited for a distal radiocephalic arteriovenous fistula, it should be considered the next preferred access option. Copyright © 2020 The Authors. Published by Elsevier Inc. All rights reserved.

^https://dx.doi.org/10.1016/j.jvs.2020.02.048

31854231


INTRODUCTION: The optimal vascular access for most dialysis patients is an arteriovenous fistula and the recognized appropriate process of care for the chronic kidney disease patient is to have the access in place ready for use when renal replacement therapy is required. Unfortunately, as a result of multiple barriers, most patients start dialysis with a catheter and many experience multiple interventions. The recent advent of the percutaneous arteriovenous fistula may offer at least a
partial solution to these problems. The purpose of this study was to report of the results of early cannulation of the percutaneous arteriovenous fistula.

MATERIALS AND METHODS: Early cannulation, less than 14 days post creation, was performed in 14 cases in order to avoid an initial catheter or continued use of a problematic catheter for dialysis. Immediately post access creation, blood flow ranged from 491 to 1169 mL/min (mean = 790 mL/min). Ultrasound was used to map potential cannulation sites prior to use. Cannulation was performed using plastic fistula cannulas.

RESULTS: Early cannulation was successful in this cohort of cases except for one cannulation complication. Dialysis treatments were otherwise uncomplicated. Primary patency at 3, 6, and 12 months was 76%, 76%, and 66%, respectively. Assisted primary patency for the same intervals was 100%, 100%, and 91%, respectively. Cumulative patency was 100% at all three-time intervals.

CONCLUSION: The results of this study suggest that the possibility of successful early cannulation with a percutaneous arteriovenous fistula can be considered as an additional factor in making this access a reasonable alternative for a surgically created arteriovenous fistula in appropriate patients.
Needle cannulation of hemodialysis access is the soft underbelly of hemodialysis access care that has remained unchanged for a long time. Cannulation error results in complications such as infiltration, hematoma, subsequent revision procedures, and potential loss of hard-earned access. The “best” cannulation method is contingent upon access type and characteristics along with local expertise. The rope ladder technique of cannulation, characterized by successive rotation of puncture sites with each hemodialysis session, permits sufficient time for healing of prior cannulation sites, and reduction in complications such as bleeding, infection, and aneurysm development. A steeper needle angle, higher blood flow rates, and deep needle tip can lead to wall stress on the posterior wall and up to 10 cm from the needle cannulation site. Plastic cannulas provide a viable alternative to metallic needles; they have lower complications and a favorable cost-benefit ratio. There is lack of evidence to support an optimal arterial needle direction configuration. Needle injury may promote intimal thickening, but its effect on access outcomes is currently unknown. Percutaneous creation of arteriovenous fistula presents new challenges in dialysis access cannulation. Point-of-care ultrasound-guided cannulation will likely lead to a paradigm shift in access cannulation. Novel care delivery using cannulation stations is a promising development.

will address the growing role of ultrasonography in the management of a patient with CKD from the point of initial contact with the nephrologist throughout the spectrum of kidney disease and its consequences. Copyright © 2020 National Kidney Foundation, Inc.

^http://dx.doi.org/10.1053/j.ackd.2020.03.005

http://www.elsevier.com/wps/find/journaldescription.cws_home/703170/description#description


31814515


In recent years, new emerging technology has allowed the endovascular creation of dialysis fistulas in the proximal forearm without the need for open surgery. Two such systems currently exist, and evidence to date has demonstrated high rates of technical success in fistula creation, high rates of dialysis functionality, and low rates of re-intervention using both systems. Whilst early trial data has demonstrated lower rates of re-intervention to maintain patency compared to surgical fistulas, endovascular re-interventions are still required to maintain functionality. The endovascular fistula (endoAVF) typically exhibits a shared drainage pattern and is morphologically distinct from the surgical fistula and patterns of failure observed often differ to what has been traditionally encountered. A fresh approach and understanding is therefore required and here we share our observations and experience of endovascular re-intervention in endoAVF created with the Wavelinq system.

^https://dx.doi.org/10.1177/1129729819888374


31894716

PURPOSE: Devices to permit percutaneous endovascular arteriovenous fistula formation have recently been introduced into clinical practice with promising initial evidence. As guidelines support a distal fistula first policy, the question of whether an endovascular arteriovenous fistula should be performed as an initial option is introduced. The aims of this study were to compare a matched cohort of endovascular arteriovenous fistula with surgical radiocephalic arteriovenous fistulas.

MATERIALS AND METHODS: Using data from a prospectively collected database over a 3-year period, a matched comparative analysis was performed.

RESULTS: WavelinQ arteriovenous fistulas (group W, n = 30) were compared with radiocephalic arteriovenous fistulas (group RC; n = 40). Procedural success was high with 96.7% for group W and 92.6% for group RC. Primary patency at 6 and 12 months was greater in group W (65.5% 6mo and 56.5% 12mo) compared to group RC (53.4% 6mo and 44% 12mo) (p = 0.69 and 0.63). Mean primary patency was significantly lower for RC (235 +/- 210 days) vs W (362 +/- 240 days) (p < 0.05). Secondary patency for group W was 75.8% and 69.5% at 6 and 12 months, respectively. Secondary patency for RC was lower at 66.7% and 57.6% at 6 and 12 months, respectively.

CONCLUSION: Outcomes of WavelinQ arteriovenous fistulas in this series are similar to published results. When compared to a contemporaneously created group of surgical fistulas, WavelinQ demonstrated superior outcomes. These data would support that WavelinQ endovascular arteriovenous fistulas may be considered as a first option in the access pathway particularly if vessels at the wrist are absent or less than ideal.

^https://dx.doi.org/10.1177/11297298198987168

32912041

Even in the best of circumstances, a significant number of patients will require adjunctive endovascular and/or surgical revision prior to achieving functional patency after endovascular or percutaneous AVF creation, at least within the United States. This rate appears to be higher after
percuteaneous AVF than after endovascular AVF, although because published reports of the former are mostly derived from American experience and those of the latter derived from experience outside the United States, it is unclear whether these differences are due to the technique itself or cultural and/or anatomic differences in dialysis access practices and patient populations. If arterial inflow is poor, this should be corrected first. When flow is adequate (perhaps 900 cc/min) but no single vein is cannulatable, a dominant suitable vein can be superficialized or transposed. If no suitable vein is dominant (most accurately assessed by using an intraoperative flowmeter), the best vein can be used, with or without occlusion of the other veins or reimplantation into the brachial artery. Finally, if the original anastomosis remains the sole supply to the cannulated vein, the original fistula has achieved assisted primary maturation (and assisted primary patency continues), while if a new arteriovenous anastomosis has been constructed, the original fistula has failed. We point out that for this reason as well as to best utilize the upper arm for later access, endovascular and percutaneous AVFs should be constructed and maintained within an atmosphere where both surgeons and non-surgeons work together on the overall access plan.

^https://dx.doi.org/10.1177/1129729820954724


32800660


PURPOSE: To prospectively evaluate the maturation of the endovascular arteriovenous fistula system (EndoAVF) for 2-needle cannulation (2NC).

MATERIALS AND METHODS: From October 2018 to June 2019, evaluation of 123 patients resulted in 95 arteriovenous fistulae, a rate of 63% (60 of 95) EndoAVF, and 37% (35 of 60) fistulae treated surgically. At 4 weeks, EndoAVF was not suitable for 2NC (defined as a palpable target vein [TV], 500 mL/min flow volume, and 5-mm diameter) underwent maturation procedures.

RESULTS: Technical success of EndoAVF creation was 96.7% (60 of 62). At 4 weeks, 67% (40 of 60) fistulae underwent maturation procedures: 62% (37 of 60) had balloon dilation, 32% (19 of 60) had brachial vein embolization, and 30% (18 of 60) had cubital vein banding, increasing TV flow volume from 182 +/- 123 mL/min to 572 +/- 225 mL/min (P < 0.0005). Transposition was required in 33% of patients (20 of 60), reducing the mean TV depth from 10.9 to 3.7 mm (P < .0001). 2NC and fistula success (2NC x 3) was achieved in 87% (47 of 54); 10% of patients (6 of 60) were not on dialysis; 6.8% of patients (4 of 60) died; 5% of fistulas (3 of 60) were abandoned for arm swelling, steal syndrome, and thrombosis. Time to 2NC, fistula success, and tunneled catheter removal were 65.6
+/− 45.7 days, 79.1 +/− 50.9 days, and 113.4 +/− 62 days, respectively. Patients achieving 2NC had brachial artery flow of 944 +/− 284 mL/min; and TV flow, diameter, and depth of 674 +/− 292 mL/min, 6.1 +/− 0.8 mm, and 3.6 +/− 1.3 mm, respectively. Major complications were arm swelling, steal syndrome, and thrombosis.

CONCLUSIONS: Most patients had EndoAVF with maturation procedures at 4 weeks that achieved rapid maturation (Ellipsys Fistula for Hemodialysis Access; NCT03828253). Copyright © 2020 SIR. Published by Elsevier Inc. All rights reserved.

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31920156


OBJECTIVE: To investigate the hemodynamics of percutaneous arteriovenous fistulae (pAVF) created between the proximal radial artery and the deep communicating vein of the elbow.

METHODS: Consecutive patients with a percutaneously created proximal radial artery to perforating vein arteriovenous fistulae were evaluated and compared with control patients with clinically well-functioning surgical wrist radiocephalic arteriovenous fistulae (sWRC-AVF).

RESULTS: Thirty-one patients with a pAVF (21 males - 68%, mean age: 62 years, range: 53-81), with mean follow-up of 254 days (range: 60-443) and 32 patients with a surgical fistula (20 males - 62%, mean age of 63 years, range: 30-84) were evaluated. Mean access flow and distribution range were similar in the two study groups, with a mean flow of 859 mL/min vs 919 mL/min, respectively. There was no significant difference in the mean radial artery diameter (4 mm vs 4.3 mm, p = 0.2). Statistically significant trends were observed for resistive index (0.57 pAVF vs 0.52 (0.07) and brachial vein cross-sectional area (13 pAVF vs 33 mm2, p = 0.06). The arteriovenous anastomosis area was significantly smaller with pAVFs (13 vs 43 mm2, p = 0.002) and the pressure difference between extremities was less for the pAVF group vs sWRC-AVF (19 vs 27 mm Hg, respectively, p = 0.03). Existence of single cephalic or basilic versus cephalic and basilic outflow did not affect vein maturation or overall flow.

CONCLUSIONS: pAVF have a favourable hemodynamic profile with many similarities when compared with surgically created wrist fistulae. Cephalic and/or basilic vein matured with only minor outflow shunted to the deep venous system.
OBJECTIVE: To investigate the feasibility of percutaneous arteriovenous fistula creation in consecutive patients screened for first access creation.

METHODS: Prospective study of ultrasound mapping based on the following minimal anatomic requirements: a patent proximal radial artery and adjacent elbow perforating vein with straight trajectory, each greater than or equal to 2 mm in diameter and within 1.5 mm of each other. In addition, the same population was evaluated for feasibility of a distal radiocephalic fistula established.

RESULTS: One hundred consecutive patients were examined between November 2018 and January 2019. Sixty-seven were male (67%) and mean age was 61 years. Sixty-three patients (63%) and a total of 100 limbs (50%) were found to be eligible for a percutaneous fistula creation with Ellipsys R. Thirty-seven percent of patients were ineligible because of the absence of both median cephalic and median cubital veins (15%), absence or inadequate elbow perforating vein and/or smaller than 2 mm proximal radial artery (14%), and/or distance greater than 1.5 mm (8%). We found suitable vessels for a surgical distal fistula creation in 91 extremities (45%), but this percentage dropped to 17% in patients over 70 years old. Among the 100 limbs eligible for percutaneous arteriovenous fistula, only 30 (30%) were eligible for radiocephalic arteriovenous fistula.

CONCLUSION: More than 60% of patients were eligible for Ellipsys. The absence of veins at the elbow and a large distance between vessels were the most common limiting factors. Less than one half of the patients were candidates for surgical fistula and this percentage dropped significantly for older individuals.
INTRODUCTION: There is lack of compelling evidence about the best technique to carry out the anastomosis between the artery and the vein: end to side or side to side. This issue was addressed by very few randomized controlled studies. This topic has recently re-emerged with the advent of the endovascular fistula creation using the side-to-side technique. Objectives: To compare the results of both surgical techniques for the creation of arteriovenous anastomosis.

METHODS: This is a randomized controlled prospective study. All renal failure patients, 18 years and older, referred to our institution requiring creation of a new arm arteriovenous fistulas, including distal radio-cephalic, ulno-basilic, proximal brachio-cephalic or brachio-basilic configurations were included.

RESULTS: Between February 2018 and October 2018, 378 patients underwent creation of permanent haemodialysis access. A total of 100 patients were randomized equally into the end-to-side and side-to-side groups. Follow-up for the study purpose continued until May 2019 (mean = 9 months, range 1-12). Patients’ age ranged from 19 to 68 years. Seventy-seven arteriovenous fistulas were created at the elbow (37 brachio-basilic and 40 brachio-cephalic). Radio-cephalic fistulae were 23, created at wrist and in the forearm. Primary technical success was 97%, and 35 (70%) and 17 (34%) cases achieved functionally maturation in the end-to-side and side-to-side groups, respectively (P = 0.0001). Primary and secondary patency rates at 12 months were 76% end to side versus 78% STS (P = 0.381) and 84% end to side versus 86% STS (P = 0.225), respectively.

CONCLUSION: End-to-side technique should be used in all instances of arteriovenous fistulas creation.

https://dx.doi.org/10.1177/1708538120976993

Since the arteriovenous fistula (AVF) was first conceived over 50 years ago, the goal to create a vascular conduit with predictable and reproducible maturation and durability continues to elude caregivers. Recently, however, advances in the understanding of vascular biology and new technologies now provides us with some optimism; we are moving toward a viable solution. A quickly maturing, sustainable, and durable arteriovenous access may soon be attainable. This review will discuss these advances. There are novel approaches to AVF creation and devices to enhance maturation, advances in arteriovenous graft material(s), and devices to safely prolong the use of tunneled dialysis catheters. Although hemodialysis (HD) access remains a complex problem, these innovations may lead the way to optimizing the care and the quality of life of those patients who have no choice but to proceed with HD.

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Recent advances in technology show promise in providing greater vascular access options for hemodialysis patients. This review discusses novel methods for creating an anastomosis for arteriovenous (AV) fistulas and new materials for prosthetic AV grafts. Two technologies for endovascular arteriovenous fistula creation, the Ellipsys and WavelinQ endovascular systems, are discussed. When an AV fistula is not possible, an AV graft or devices to augment the AV fistula may be appropriate. New materials that have been developed that show promise as an alternative to the expanded polytetrafluoroethylene graft are discussed. Such potential conduits include bioengineered vessels and both allogenic or xenogenic biologic grafts. Devices designed to optimize blood flow to reduce maturation failure and improve AV fistula outcomes are explored. Copyright © 2020 National Kidney Foundation, Inc. Published by Elsevier Inc. All rights reserved.

Treatment of malignancies with ionizing radiation has saved countless lives in the past 50 years. However, a small percentage of patients treated with radiation for head and neck cancers will develop osteoradionecrosis (ORN) of the jaw. Patients treated with more than 6000 centigrays (cGy) of radiation have an approximately 9% incidence of developing mandibular osteoradionecrosis. A newer radiation technique called intensity-modulated radiation therapy (IMRT) has been reported to have a lower incidence of mandibular osteoradionecrosis. Some of these patients will develop exposed intraoral mandibular bone. Many of these patients will go on to heal spontaneously and without complications, but some will develop osteomyelitis and even fractures of the mandible leading to eventual soft tissue necrosis.[1][2] Hyperbaric oxygen treatment has become a mainstay treatment for osteoradionecrosis. An interprofessional team consisting of oral maxillofacial surgeons, dentists, undersea and hyperbaric medicine specialists, infectious disease specialists, and radiation oncologists can optimize treatment for patients who develop osteoradionecrosis as a complication of radiation treatment. Hyperbaric treatments should be given adjunctively with surgical debridement and appropriate culture-directed antibiotic therapy to provide the most optimal outcome. Osteoradionecrosis is the result of an avascular, aseptic necrosis. Much of the pioneering studies on hyperbaric oxygen for osteoradionecrosis were done by Robert Marx, DDS who developed a staging system and treatment protocols for osteoradionecrosis. Marx’s scale classifies mandibular necrosis and is used to describe the severity of the osteoradionecrosis. Scale of Osteoradionecrosis Stage I: Patients with exposed bone which has been chronically present or which developed rapidly. Patients are treated with 30 hyperbaric treatments preoperatively followed by bony debridement. Postoperatively they are given an additional ten treatments. Stage II: These are patients who do not respond favorably to 30 pre-operative treatments, or when a more major operative debridement is required. Surgery for stage II osteoradionecrosis patients must be focused on preserving the integrity of the mandible. If mandibular resection is anticipated, patients are advanced to Stage III. Stage III: Along with patients who have progressed from stages I and II, patients with stage III osteoradionecrosis have serious and potentially grave prognostic findings such as pathologic fracture, percutaneous fistulae, and lytic lesions that extend to the inferior border of the mandible. For patients with stage III osteoradionecrosis, mandibular resection is planned as part of the surgical treatment. It is critical that all necrotic bone be debrided and removed in stage III patients. Stage III osteoradionecrosis patients receive 30 treatments preoperatively followed by ten hyperbaric oxygen treatments postoperatively.[3][4][5][3] Copyright © 2020, StatPearls Publishing LLC.

Dialysis is the preferred treatment for patients with end-stage renal disease (ESRD) for the removal of accumulated toxins secondary to compromised renal function. Hemodialysis has traditionally been performed via a surgically created arteriovenous fistula (AVF) or arteriovenous graft (AVG). Novel endovascular techniques have allowed for the creation of percutaneous arteriovenous fistulas for hemodialysis access. Two devices, the Ellipsys R Vascular Access System (Avenu Medical, Inc., San Juan Capistrano, California) and the WavelinQ EndoAVF System (C.R. Bard, Inc., Murray Hill, New Jersey), are currently available for percutaneous AVF creation and investigation of their utility is ongoing. This paper describes the current utilization, differences, and results thus far with these devices and, additionally, investigates the contemporary advantages, disadvantages, and selection criteria for percutaneous AVFs overall.


BACKGROUND AND OBJECTIVES: The recent advent of a device to create a proximal radial artery arteriovenous fistula using an endovascular approach to create the anastomosis represents a significant advance in dialysis access creation. This endovascular arteriovenous fistula offers the beneficial attributes of the proximal radial artery arteriovenous fistula while adding the advantages of avoiding a surgical procedure. The endovascular arteriovenous fistula can be created safely, functions well, has excellent patency, and has a high degree of patient satisfaction. The purpose of this study is to report the 2-year cumulative patency rate for a large multicenter cohort of endovascular arteriovenous fistula cases.

DESIGN: An endovascular arteriovenous fistula was created in 105 patients using either local or regional anesthesia and conscious sedation. Patient data were obtained from each program’s electronic health record system. Data collection was truncated at 2 years postprocedure and used to calculate cumulative patency. Post-access creation patient satisfaction was assessed.

RESULTS: A physiologically mature arteriovenous fistula (blood flow 500 mL/min and a target vein internal diameter 4 mm) was obtained in 98%. A clinically functional arteriovenous fistula (supporting two-needle dialysis according to the patient’s dialysis prescription) was demonstrated in 95%. Access failure resulting in the loss of access occurred in eight cases during the study period.
The cumulative patency rate at 6, 12, 18, and 24 months was 97.1%, 93.9%, 93.9%, and 92.7%, respectively. The post-procedure patient evaluation emphasized a high level of patient satisfaction.

CONCLUSION: The proximal radial artery arteriovenous fistula created using an endovascular approach for the anastomosis is associated with excellent 2-year cumulative patency and is associated with a high level of patient satisfaction.

^https://dx.doi.org/10.1177/1129729819877780


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30764701


PURPOSE: To describe a maneuver to facilitate percutaneous arteriovenous fistula creation during venous arterialization procedures in patients with no-option critical limb ischemia.

TECHNIQUE: Following a failed arterial recanalization attempt, a balloon catheter is passed up to the tip of the guidewire. Venous access is gained distally, a 4-F sheath is antegradeley passed, and a 4-mm GooseNeck snare is advanced through it. A fluoroscopic view that overlaps the snare and the inflated balloon is obtained. If the vein remains anterior with respect to the artery, a needle is inserted across the vein, passing through the snare loop and puncturing the intra-arterial balloon. A wire is inserted and placed inside the punctured balloon. The balloon is retrieved and the wire externalized through the femoral access. A catheter is advanced antegradeley over this wire from the artery into the vein. If the vein remains posterior to the artery, a needle is inserted, puncturing the balloon and thereafter the vein (crossing through the snare). A wire is inserted, captured by the snare, and externalized through the vein sheath. A catheter is finally advanced over this wire from the vein into the artery.

CONCLUSION: This maneuver is a simple alternative to create an arteriovenous fistula during venous arterialization procedures in patients with no-option critical limb ischemia.

^https://dx.doi.org/10.1177/1526602819830983


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Malik et al, Kidney Medicine, "Endovascular Versus Surgical Arteriovenous Fistulas: A Systematic Review and Meta-analysis"

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Background: Hemodialysis arteriovenous fistulas (AVFs) are inconstantly used primarily due to problems with maturation, early thrombosis and patient nonacceptance. An endovascular approach to fistula creation without open surgery offers another hemodialysis vascular access option. Method(s): Published studies as well as our own clinical experience and remarkable single center cases are analyzed. Basic literature is reported and expert opinions are discussed. Result(s): AVFs with fused anastomoses (Avenu Medical, Ellipsys) were created in 95.0% (102/107) of patients. Primary flow and diameter endpoints were achieved in 86.0% (92/107) of patients. In the NEAT study (Novel Endovascular Access Trial, using the everlinQ 6Fr system), 80 patients were enrolled. In the EASE study and in all of our patients (access from the wrist) using the novel 4Fr everlinQ system, an endoAVF was successfully created. Due to the unique anatomy and vessels used to create endoAVFs, those studies were single-arm studies without a surgical comparator. Conclusion(s): An endoAVF can be reliably created using different catheter-based systems, without open surgery and with minimal complications. EndoAVFs can be successfully used for hemodialysis and demonstrated a high 12-months cumulative patency in several studies. In the future, it may be an alternative for achieving AVFs for hemodialysis patients in need of a vascular access. Copyright © 2019, The Author(s).

^http://dx.doi.org/10.1007/s00772-018-0500-y

http://link.springer.de/link/service/journals/00772/index.htm


Patients with end-stage renal disease that require chronic haemodialysis need a reliable vascular access. Unanimously, native arteriovenous fistulae are considered to be the most reliable access for patients with reasonable life expectancy. For the last 60 years arteriovenous fistulae have been created surgically at the wrist or the elbow with variable rates of success, maturation problems, reinterventions and complications, making this field of surgery particularly challenging and full of scientific controversies. The recent addition of the technical ability to create arteriovenous fistulae percutaneously comes to add one more option for the patients and one more source of controversy for the experts. Copyright © 2019 Societe francophone de nephrologie, dialyse et transplantation. Published by Elsevier Masson SAS. All rights reserved.

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Surgical fistulas were first described over 50 years ago and have revolutionized the outlook for millions of dialysis-dependent patients. Despite many developments, results remain sub-optimal with high rates of primary failure and re-intervention to maintain patency. Surgical fistulas are known to fail in part due to intimal hyperplasia leading to stenosis, and vessel manipulation during anastomosis creation can be contributory. New technology is emerging that allows the endovascular creation of fistulas with minimal vessel trauma and the initial results demonstrate encouraging outcomes with high technical success rates, low re-intervention, and failure rates and good usability for hemodialysis. Two such device systems are currently available, and here, we provide an overview of the current global status of endoAVF, patient selection criteria, trial results, technical aspects, re-interventions, and outlook for the future.
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INTRODUCTION: The aim of this study is to report our clinical hemodialysis experience using a percutaneous arteriovenous fistula (pAVF) created with the Ellipsys R vascular access system. This pAVF device creates a permanent AVF anastomosis between the proximal radial artery (PRA) and the deep communicating vein (DCV) in the proximal forearm.

METHODS: The medical records of all patients with a pAVF were retrospectively reviewed. The clinical data analyzed included reliability of pAVF use, quality of dialysis, rate and success of puncture, and pAVF related complications, along with incidence of subsequent interventions.

FINDINGS: Between May 2017 and November 2018, 34 patients had a pAVF created with technical success in 33 patients (97%). Twenty-eight out of 34 (82%) patients had successful two-needle cannulation within 10 days to 6 weeks after pAVF creation. The mean Kt/v was 1.6 (1.2-2) and the average recirculation was 10%. Fifteen patients (44%) needed no further access...
 intervention. Twelve patients (35%) required an additional procedure to assist maturation of the pAVF in order to facilitate puncture. The average blood flow measured at the brachial artery, before the first cannulation, was 850 ml/min. From causes unrelated to the procedure, four patients died during the follow-up study. Two patients required revision to a surgical AVF. None of the pAVFs developed aneurysmal degeneration steal syndrome, or high access flow related issues.

DISCUSSION: The Ellipsys R pAVF offers a safe and functional vascular access for hemodialysis. Advantages included prompt access maturation, avoidance of high flow AVFs, and a simple nonsurgical procedure with high patient satisfaction. Functional outcomes are equivalent and likely better than surgical fistulas. There appears to be less aneurysmal degeneration and need for future re-intervention. Objective dialysis parameters indicate excellent quality of hemodialysis for the patient. Copyright © 2019 The Authors. Hemodialysis International published by Wiley Periodicals, Inc. on behalf of International Society for Hemodialysis.

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Objective: Arteriovenous fistulas (AVFs) used for hemodialysis commonly undergo multiple percutaneous and open interventions to maintain functional patency, but it is unclear whether this strategy is cost-effective. The aim of this study was to evaluate the clinical effectiveness and cost-effectiveness of performing repeated interventions vs starting a new AVF. Method(s): We reviewed all patients with mature radiocephalic, brachiocephalic, and brachiobasilic AVFs at a single academic institution between 2007 and 2015 and assessed the clinical effectiveness of each open and percutaneous intervention to maintain functional patency after the fistula was created. These data were used to parameterize a Markov simulation model to determine the cost-effectiveness for performing an open or percutaneous intervention vs creating an AVF at a new anatomic location. This model compared strategies of creating a new AVF after the first to fourth reintervention within a 1-year time window, with the reference being creation of a new AVF on the fourth reintervention. Costs were measured from Medicare’s perspective, and effectiveness was measured as quality-adjusted life-years (QALYs) and time in functional access. Incremental cost-effectiveness ratios (ICERs) were calculated by taking the ratio of the difference in cost and the difference in effectiveness between two strategies. Result(s): A total of 720 AVFs that were created during the 8-year period reached maturity, and 407 (56%) underwent at least one intervention to maintain functional patency, with the median (interquartile range) time to first reintervention of 12.6 (10-17)
months. For the strategies of creating a new AVF after the first versus the fourth reintervention, payer costs ranged from $3519 to $3922 for open procedures and $2134 to $3922 for percutaneous procedures. The ICERs for open interventions on failing AVFs were $357,143/QALY after the first reintervention and $95,876/QALY after the second reintervention. The ICERs for percutaneous interventions on failing AVFs ranged from $1,522,078/QALY after the first reintervention to $443,243/QALY after the third reintervention. Conclusion(s): Whereas the clinical effectiveness of performing percutaneous interventions on failing AVFs diminishes after each reintervention, they are nevertheless less costly than creating a new AVF. In comparison, our data show that creating a new AVF is cost-effective after the second open reintervention procedure. Copyright © 2019


BACKGROUND: The use of arteriovenous fistula (AVF) is hampered by long surgical wait times, slow maturation, and upwards of 60% that do not mature. We describe our clinical experience in using a system with a 4F catheter profile for endovascular AVF creation in patients on hemodialysis.

METHODS: This was a multioperator, single-center, single-arm, prospective study intended to evaluate safety and efficacy of a 4 Fr endovascular AVF (endoAVF) system for the creation of vascular access in hemodialysis patients. The study was performed after institutional review board approval at Italian Hospital (Asuncion, Paraguay). Patients were followed up at regular intervals through 6 months to determine procedural, maturation, and cannulation success as well as intervention rate and patency.

RESULTS: From May to November 2016, 32 patients underwent the endoAVF procedure with no device-related adverse events. An endoAVF was successfully created in the proximal forearm for all 32 patients (20 between the radial artery and radial vein; 12 between the ulnar artery and ulnar vein). Wrist access was used for 72% (23/32) of the procedures for the arterial catheter and 59% (19/32) of the procedures for the venous catheter. The device successfully created an endoAVF in every patient for a technical success rate of 100% (32/32). The device- or procedure-related serious adverse event rate was 3% (1/32); one patient experienced a venous guidewire perforation successfully managed with a stent graft. Primary and cumulative patency rates through 6 months were 83% and 87%, respectively, with an intervention rate of 0.21 per patient-year. Physiological
suitability, as defined by target flow rates \(\geq 500\) ml/min and cannulation vessel diameters \(\geq 4\) mm, was achieved in 91\% (29/32) of patients by 90 days. Successful 2-needle cannulation was achieved in 78\% (21/27) by 90 days, with mean time to cannulation of 43 +/- 14 days. Functional cannulation, as defined by successful 2-needle cannulation for two-thirds of the dialysis sessions within 1 month, was achieved in 95\% (20/21) of the patients who were successfully cannulated for an overall rate of 74\% (20/27). All patients who achieved functional cannulation had their central venous catheters (CVCs) removed before the 90-day follow-up for a CVC removal rate of 74\% (20/27).

CONCLUSIONS: The 4 Fr endoAVF system allowed for multiple access and fistula creation site options to tailor the procedure to individual patient anatomy. Furthermore, the outcomes are comparable to previous generation endoAVF technology, with a potentially improved safety profile because of the use of arteries at the wrist for access. Copyright © 2019 The Authors. Published by Elsevier Inc. All rights reserved.

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Worldwide, hemodialysis remains the prevalent dialysis modality for more than 2 million patients who require well-functioning vascular access for this procedure. Creation of an arteriovenous fistula for long-term hemodialysis was the first innovation since the Scribner shunt and was followed by the development of an arteriovenous graft and catheter. Bioengineered vessels were developed during the last century, but this field has been energized by recent technology relating to the creation of human vessels. Novel endovascular techniques for creating an arteriovenous fistula may resolve some of the logistical issues involved in obtaining a timely arteriovenous fistula. Treatment of access stenosis, infection, and thrombosis has remained suboptimal, and innovative technologies are evolving. Many new approaches are now targeting the biological and mechanical aspects of vascular access, such as creation and maturation of arterial and venous anastomoses, development of a biological conduit for outflow, and negotiating the problems of central vein stenosis. Importantly, processes of access care that have long focused on arteriovenous fistulas are now recognizing the new paradigm, providing a complementary niche to arteriovenous grafts and dialysis catheters in the algorithm for individualized access placement. Cumulatively, to the credit of the multidisciplinary team approach, the long overdue focus on the very existential issue of vascular access for hemodialysis is being approached with newfound evidence-based enthusiasm as the vexing challenges related to regulations and reimbursement in hemodialysis persist. Patient choice
and experience, often missed and ignored in the challenging management of an end-stage organ failure, need to stay central as we focus on patient-centered care of vascular access. Copyright © 2019 International Society of Nephrology. All rights reserved.

Objectives: We reviewed our initial experience creating a percutaneous arteriovenous fistula (pAVF) using a thermal resistance anastomosis device with proximal radial artery inflow.

Methods: A retrospective review was conducted of all patients who underwent a pAVF creation procedure between May 2017 and October 2017. Primary end points of the study were technical success, patency by Doppler ultrasound examination or angiography, flow levels achieved, time to first use, and pAVF-related complications.

Results: A pAVF was attempted in 34 patients with technical success in 33 individuals (97%). Patency of the pAVF was 94%. Mean access flow was 946 mL/min (brachial artery measurement) at the latest follow-up visit (53-229 days; average, 141 days). At 6 weeks, all fistulas have been used or were ready for dialysis by clinical examination or ultrasound examination. Only one patient required superficialization of the upper arm cephalic vein by lipectomy. There were no adverse events related to the pAVF creation or use, nor was there need for further interventions.

Conclusions: Successful pAVFs with proximal radial artery inflow were created with excellent initial results regarding technical success, patency, and safety. Advantages include avoidance of a surgical incision, short procedure times, good acceptance by patients, prompt access maturation, moderate flow, and low-pressure access, with possible reduction of risk for ischemic complications. Avoidance of vessel manipulation and side branch ligation might reduce risk of thrombosis and improve long-term patency and reduce need for further interventions. These early findings need to be confirmed in larger and longer follow-up studies. Copyright © 2018 The Authors. Published by Elsevier Inc. All rights reserved.


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Introduction: Arteriovenous fistulas (AVF) are the preferred method of vascular access for chronic haemodialysis. However, excess shunting through the AVF can result in dialysis-access steal syndrome (DASS) or high-output cardiac failure. Percutaneous AVF banding is a minimally-invasive technique for treating DASS with good short-intermediate term results.

Material(s) and Method(s): We review a case series of percutaneous AVF banding procedures for DASS and high-output cardiac failure to illustrate the technique and limitations of this technique. Result(s): Two representative cases from our local experience were selected to illustrate the technique in a stepwise manner. Both cases were performed for DASS, with good technical success. However, clinical success was limited in one case due to underlying arterial insufficiency. The technique, selection of appropriate banding diameter for flow reduction, limitations and complications of alternative surgical techniques are discussed. Conclusion(s): Percutaneous AVF banding is a relatively straightforward and effective minimally-invasive technique for treatment of DASS supported by short-intermediate term data.


PURPOSE: To evaluate safety and efficacy of arteriovenous fistulas (AVFs) created with a thermal resistance anastomosis device.

MATERIALS AND METHODS: A prospective single-arm trial at 5 sites enrolled 107 patients. Patients underwent ultrasound (US)-guided anastomosis creation between the proximal radial artery and perforating vein with the Ellipsys Vascular Access System (Avenu Medical, Inc, San Juan...
Capistrano, California) followed by separate maturation procedures. Primary endpoints were brachial artery flow volume $\geq 500$ mL/min and target vein diameter $\geq 4$ mm in $>49\%$ of patients and absence of device-related complications at 90 days.

RESULTS: AVFs with fused anastomoses were created in 95% (102/107) of patients. Maturation procedures included anastomotic balloon dilation in 72% (77/107), brachial vein embolization in 32% (34/107), cubital vein ligation in 31% (33/107), and surgical transposition in 26% (28/107) of patients. Primary flow and diameter endpoints were achieved in 86.0% (92/107) of patients, exceeding performance goal of 49% (P < .0001). No major adverse events were attributed to the device. Cumulative patency was 91.6%, 89.3%, and 86.7% at 90 days, 180 days, and 360 days. Target dialysis veins were cephalic, basilic, and brachial veins in 74% (73/99), 24% (24/99), and 2% (2/99) of patients. Two-needle dialysis was achieved in 88% (71/81) of patients on hemodialysis at a mean 114.3 days +/- 66.2. Functional patency was 98.4%, 98.4%, and 92.3% at 90 days, 180 days, and 360 days.

CONCLUSIONS: The Ellipsys R Vascular Access System met primary safety and efficacy endpoint goals in the US pivotal trial. Copyright © 2017 SIR. Published by Elsevier Inc. All rights reserved.

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INTRODUCTION: Arterioureteral fistula (AUF) is a rare but potentially life-threatening disease that primarily arises as a long-term complication in oncological patients who have permanent ureteral stenting. The incidence is rising. The objective of this study was to outline the risk factors for management and outcome of AUF in a large individual case series.

PATIENTS AND METHODS: Twenty-six AUF cases in 24 patients from six German tertiary referral centers occurring between 2008 and 2016 were identified retrospectively and entered into a dedicated database by using patient notes and outpatient visits.

RESULTS: Of 24 patients, 23 had a history of abdominopelvic surgery for oncological disease, 21/24 had undergone radiotherapy, and 23/24 had long-term ureteral stenting. All cases presented with visible hematuria, 11/26 at the time of a stent exchange. Blood transfusions were required in 92.3%, and intravenous inotropes were needed in 46.2%. Of 26 patients, 11 had flank pain. CT angiogram was positive in 35.7%. Angiography and endovascular fistula repair was performed in
88.5%, and the rest received open surgical repair. Mortality was 7.7%. Endovascular treatment was technically successful in 91.3%, and open surgery was successful in ¾ cases. Recurrent AUF developed in 3/24 patients. Stent-related complications occurred in 15%. Vascular complications were common. Long-term survival was limited due to progression of the underlying malignant disease.

CONCLUSION: AUF results in major hemorrhage and warrants time-efficient diagnosis and treatment. Awareness is key. When AUF is considered, interventional angiography should promptly be performed. Fistula detection can be improved by guidewire manipulation. Pre-interventional CT angiogram may be omitted due to low sensitivity. Endovascular repair with stenting and/or coiling is effective and safe.


MATERIALS AND METHODS: Data from the United States Renal Data System (USRDS) were abstracted to determine the rate of AVF interventions performed in the first year and associated costs (based on Medicare payment rates) for SAVFs created from 2011 to 2013 in the incident and prevalent patient cohorts. Comparative data for endoAVF were obtained from the Novel Endovascular Access Trial (NEAT). Event rates, intervention-free survival, and costs were compared between endoAVF and SAVF cohorts after 1:1 propensity score (PS) matching.

RESULTS: In the matched incident patients, the event rate was 0.74 per patient-year (PY) for endoAVF versus 7.22/PY for SAVF (P < .0001), with a difference in expenditures of $16,494. Similarly, in matched prevalent patients the event rate was 0.46/PY for endoAVF vs 4.10/PY for SAVF (P < .0001), resulting in a cost difference of $13,389. Time-to-event analysis showed that at 1 year, 70% of endoAVF patients experienced freedom from intervention versus only 18% of SAVF patients for incident patients; these numbers were 62% and 18% for endoAVF and SAVF prevalent patients, respectively (P < .0001 for both).
CONCLUSIONS: Both incident and prevalent patients with endoAVF required fewer interventions and had lower costs within the first year compared with matched patients with SAVF. Copyright © 2018 SIR. Published by Elsevier Inc. All rights reserved.

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INTRODUCTION: Due to early and late failures that may occur with surgically created hemodialysis arteriovenous fistulas (SAVF), post-creation procedures are commonly required to facilitate AVF maturation and maintain patency. This study compared AVF post-creation procedures and their associated costs in patients with SAVF to patients with a new endovascularly created AVF (endoAVF).

METHODS: A 5% random sample from Medicare Standard Analytical Files was abstracted to determine post-creation procedures and associated costs for SAVF created from 2011 to 2013. Medicare enrollment during the 6 months prior to and after the AVF creation was required. Patients’ follow-up inpatient, outpatient, and physician claims were used to identify post-creation procedures and to estimate average procedure costs. Comparative procedural information on endoAVF was obtained from the Novel Endovascular Access Trial (NEAT).

RESULTS: Of 3764 Medicare SAVF patients, 60 successfully matched to endoAVF patients using 1:1 propensity score matching of baseline demographic and clinical characteristics. The total post-creation procedural event rate within 1 year was lower for endoAVF patients (0.59 per patient-year) compared to the matched SAVF cohort (3.43 per patient-year; p<0.05). In the endoAVF cohort, event rates of angioplasty, thrombectomy, revision, catheter placement, subsequent arteriovenous graft (AVG), new SAVF, and vascular access-related infection were all significantly lower than in the SAVF cohort. The average first year cost per patient-year associated with post-creation procedures was estimated at US$11,240 USD lower for endoAVF than for SAVF.

CONCLUSIONS: Compared to patients with SAVF, patients with endoAVF required fewer post-creation procedures and had lower associated mean costs within the first year.

^https://dx.doi.org/10.5301/jva.5000723

INTRODUCTION: Surgical creation of a radiocephalic fistula is the gold standard of vascular access for hemodialysis. Recently, an endovascular approach for upper arm fistula creation (endoAVF) has been developed, which may be an alternative to open surgery. We describe a case series of eight cases showing feasibility, early complications and outcome of this novel treatment option.

MATERIALS AND METHODS: Between July 2015 and February 2016, we created an endoAVF in eight patients. Indications for endoAVF were confirmed by a multidisciplinary vascular board upon the exclusion for Cimino fistula candidates. Patients were suitable for the procedure after a pretherapeutic ultrasound showed adequate brachial and ulnar vessels and no ipsilateral central venous stenosis. Patient characteristics, technical success, total patient radiation dose, complication rates, time to maturation of endoAVF and clinical effectiveness at six months were assessed retrospectively.

RESULTS: Creation of endoAVF using the everlinQ endoAVF system (TVA Medical Inc., Austin, TX, USA) was successful in all eight cases. There were one minor intraprocedural complication and no postoperative complications. Median time to endoAVF maturation was 63 days (range 26-137 days). One patient was lost to follow-up after the first monitoring visit. In the remaining seven patients, hemodialysis was started without problems. Patency after 6 months was 100%.

DISCUSSION: The endoAVF demonstrated to be feasible and safe for the creation of arteriovenous fistula suitable for hemodialysis access. Further studies with more patients and longer follow-up periods are needed to assess long-term outcomes and comparability to surgical dialysis access creation.

BACKGROUND: Hemodialysis arteriovenous fistulas (AVFs) are suboptimally used primarily due to problems with maturation, early thrombosis, and patient nonacceptance. An endovascular approach to fistula creation without open surgery offers another hemodialysis vascular access option.

STUDY DESIGN: Prospective, single-arm, multicenter study (Novel Endovascular Access Trial [NEAT]).

SETTINGS & PARTICIPANTS: Consecutive adult non-dialysis-dependent and dialysis-dependent patients referred for vascular access creation at 9 centers in Canada, Australia, and New Zealand.

INTERVENTION: Using catheter-based endovascular technology and radiofrequency energy, an anastomosis was created between target vessels, resulting in an endovascular AVF (endoAVF).

OUTCOMES: Safety, efficacy, functional usability, and patency end points.

MEASUREMENTS: Safety as percentage of device-related serious adverse events; efficacy as percentage of endoAVFs physiologically suitable (brachial artery flow >= 500mL/min, vein diameter >= 4mm) for dialysis within 3 months; functional usability of endoAVFs to provide prescribed dialysis via 2-needle cannulation; primary and cumulative endoAVF patencies per standardized definitions.

RESULTS: 80 patients were enrolled (20 roll-in and 60 participants in the full analysis set; the latter are reported). EndoAVFs were created in 98% of participants; 8% had a serious procedure-related adverse event (2% device related). 87% were physiologically suitable for dialysis (eg, mean brachial artery flow, 918mL/min; endoAVF vein diameter, 5.2mm [cephalic vein]). EndoAVF functional usability was 64% in participants who received dialysis. 12-month primary and cumulative patencies were 69% and 84%, respectively.

LIMITATIONS: Due to the unique anatomy and vessels used to create endoAVFs, this was a single-arm study without a surgical comparator.

CONCLUSIONS: An endoAVF can be reliably created using a radiofrequency magnetic catheter-based system, without open surgery and with minimal complications. The endoAVF can be successfully used for hemodialysis and demonstrated high 12-month cumulative patencies. It may be a viable alternative option for achieving AVFs for hemodialysis patients in need of vascular access. Copyright © 2017 The Authors. Published by Elsevier Inc. All rights reserved.

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26972281


PURPOSE: The purpose of this study was to evaluate congenital arteriovenous fistulae in the neck, including vertebrovertebral and carotico-jugular arteriovenous fistula, with their endovascular management.

MATERIALS AND METHODS: Six patients with congenital arteriovenous fistulae in the neck who underwent endovascular treatment between March 2001 and December 2013 at the Department of Radiology, Ege University School of Medicine were enrolled into this retrospective study. There were four men and two women, with a mean age of 8.6 (range 4-17) years. Patients’ demographics and symptoms were noted. Diagnostic computed tomography and/or magnetic resonance angiography were available in all patients. Parent artery and vein of the arteriovenous fistula, location of the fistula, the other features of fistula, endovascular occlusion site, number and type of endovascular materials, and length of follow-up were reviewed.

RESULTS: Four patients had vertebrovertebral fistula, while two patients had carotido-jugular fistula (fistula between maxillary artery and external jugular vein). Four patients underwent detachable balloon occlusion together with coil embolization, while two patients underwent detachable balloon occlusion only. The parent artery was occluded in five patients without clinical consequences, and the remaining fistula was occluded with preservation of the parent artery. The patients did not have any complication in the follow-up period (mean follow-up, 9 months).

CONCLUSION: Congenital arteriovenous fistulae in the neck are extremely rare. Endovascular fistula occlusion with parent vessel sacrifice appears to be a safe and minimally invasive treatment option with good results during the follow-up period. Copyright © 2015 Editions francaises de radiologie. Published by Elsevier Masson SAS. All rights reserved.

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Objective: Routine embolization is not completely effective for patients with complicated traumatic carotid cavernous fistula. The aim of this study is to evaluate the clinical outcomes and factors affecting the complications in balloon-assisted Onyx 18 embolization implemented through transarterial and transvenous approaches. Method(s): 38 patients who were not suitable for detachable balloon embolization or underwent the embolization but were not cured or relapsed were selected for the study. They were treated by injecting Onyx 18 through two micro-catheters inserted cavernous sinus through transarterial and transvenous approaches. Result(s): Angiograms taken immediately after the embolization showed that the arteriovenous fistulas disappeared completely in all the patients. Internal carotid artery occlusion was observed in one patient due to Onyx diffusion into the carotid artery. In another patient, small amount of Onyx was washed to the M4 segment of middle cerebral artery by the blood. In other two patients, the glue floated on the arterial wall of internal carotid. After surgery, five (23.7%) patients showed new symptoms of oculomotor nerve damage. During the follow-up period, 77.3% of the patients had normal oculomotor nerve function, and the recovery speed was found not related to the injection dose or oculomotor nerve injury prior to the operation. Conclusion(s): Simultaneous transarterial and transvenous approach is effective and safe for TCCF patients who are not suitable for detachable balloon embolization or are difficult to treat with the embolization. During the surgical procedure, micro-catheters should be precisely positioned with minimal injection of Onyx 18 to reduce complications. Copyright © 2016, E-Century Publishing Corporation. All rights reserved.


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Purpose Arteriovenous fistulae (AVFs) created by conventional surgical techniques are associated with suboptimal short- and long-term patency. This study investigated the feasibility of creating fistulae with a percutaneous system and evaluated the utility of percutaneous AVFs (pAVFs) in providing hemodialysis access. Materials and Methods From August 2012 to September 2013, a percutaneous system was used to attempt pAVF creation between the proximal ulnar artery and a closely associated ulnar vein in 33 patients. Technical success, adverse events, and time to pAVF maturity were recorded, as was clinical effectiveness at 6 months. Results A pAVF was successfully
created in 32 of 33 patients (97%). Four patients died during the follow-up period from causes unrelated to the procedure; one patient was lost to follow-up. Of the remaining 27 patients, 24 were undergoing successful dialysis via their pAVF at 6 months. Two additional patients had usable access but did not initiate dialysis during the study. One spontaneous pAVF thrombosis occurred in a patient with preexisting central vein stenosis. Cumulative pAVF patency at 6 months was 96.2% (26 of 27; standard error, 3.8%). Mean time to pAVF maturation was 58 days (range, 37-168 d). There was one serious procedure-related adverse event and five minor procedure-related adverse events.

Conclusions Although larger studies are required to validate efficacy in a wide range of patients, this study demonstrates hemodialysis access successfully created with an endovascular catheter-based system. Patency of pAVFs and time to maturation were superior to published results of surgical techniques.

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