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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/11567

DOI URL: <http://dx.doi.org/10.21474/IJAR01/11567>



RESEARCH ARTICLE

OUTCOMES OF HYBRID INTERVENTIONS FOR LOWER LIMB REVASCULARIZATION IN PATIENTS PRESENTING WITH CHRONIC LIMB THREATENING ISCHEMIA- A SINGLE CENTER EXPERIENCE

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Manuscript Info

Manuscript History

Received: 25 June 2020

Final Accepted: 30 July 2020

Published: August 2020

Abstract

Purpose: To study the outcome of hybrid lower limb revascularization procedures in patients presenting with significant multi-segment involvement - iliac and infrainguinal disease with CLTI

Methodology: Retrospective analysis of all hybrid lower limb interventions performed for CLTI from January 2018 to December 2018. Follow up data was collected until August 2020 from a prospectively maintained database.

Procedures Done: plasty/stenting with endarterectomy/ bypass (femoropopliteal, femorotibials)

Results: A total of 17 male patients underwent hybrid procedures during the study period. 9/17 patients had an angioplasty and the remaining patients had an angioplasty along with iliac artery stenting. The overall death-censored patency rate was 51.76%. The death-censored patency rates between the two cohorts were not significantly different (log rank $p=0.27$). The overall amputation rate was 29.41% (4 in Angioplasty cohort vs. 1 in Angioplasty + stenting cohort). The patient survival was 87.5%, the ulcer healing rate was 52% and ABI improvement - 100%.

Conclusion: This study illustrates that in patients with significant iliac artery disease with associated infra-inguinal involvement, Hybrid procedures have favourable outcome with high patency and amputation free survival rates with reduced hospital stay/mortality.

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Introduction:-

Multilevel atherosclerotic disease is not uncommon in patients with critical limb threatening ischemia of the lower extremities. It is often associated with multiple comorbidities like Diabetes, Systemic Hypertension, ESRD, CAD, etc. This results for disease in distant vascular territories and makes these patients a high risk for extensive open surgical procedures. Whilst the hybrid revascularization surgery combines the well-established patency advantages of open vascular surgery with the benefits of less-invasive endovascular interventions to provide a better and safe solution that can be customized to individual patients and patterns of disease. This study is to outline the outcomes of hybrid lower limb revascularization procedures in patients presenting with significant multisegment involvement - iliac and infrainguinal disease with CLTI in our institution.

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Methodology:-

A single center retrospective analysis of all hybrid lower limb interventions [iliac endovascular intervention (either an angioplasty or an angioplasty with stenting) along with infra-inguinal open revascularization procedures] performed for chronic limb threatening ischemia from January 2018 to December 2018 was done. Follow up data was collected until August 2020 from a prospectively maintained database. The primary outcomes of interest were patency rate and amputation rate. The secondary endpoints were patient survival, ABPI improvement, ulcer healing, and comparison of patency rate between angioplasty and stenting. Categorical variables are expressed as frequency (%). Kaplan-Meier survival curves were used for plotting patency and survival. The difference between survivals were analysed using log-rank test. Statistical analysis was performed using Graph Pad Prism (Version 8).

Procedures:

We performed common femoral endarterectomy and/or bypass surgery combined with interventional treatments of either the inflow, outflow, or both. Iliac endovascular intervention (either an angioplasty or an angioplasty with stenting) along with infra-inguinal open revascularization procedures like femoro – popliteal / femoro -tibial Bypass or CFA endarterectomy.

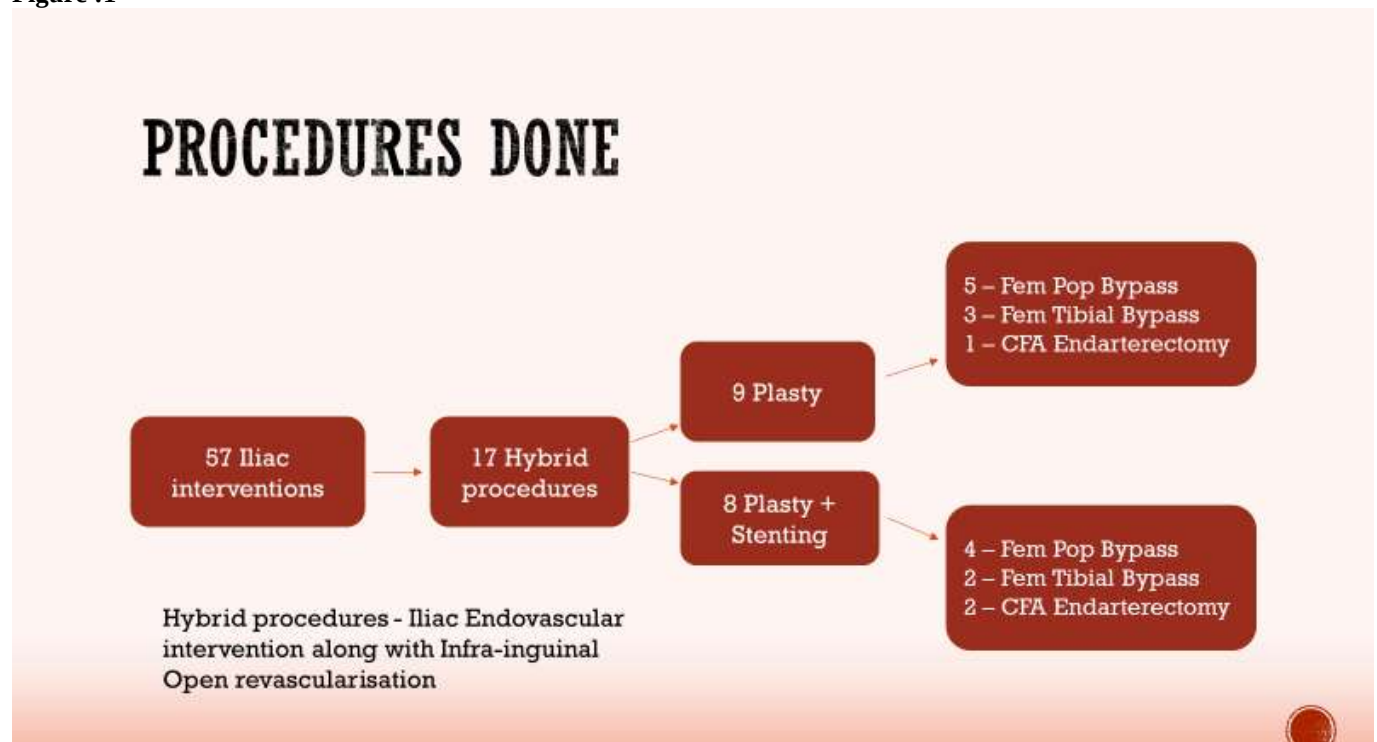
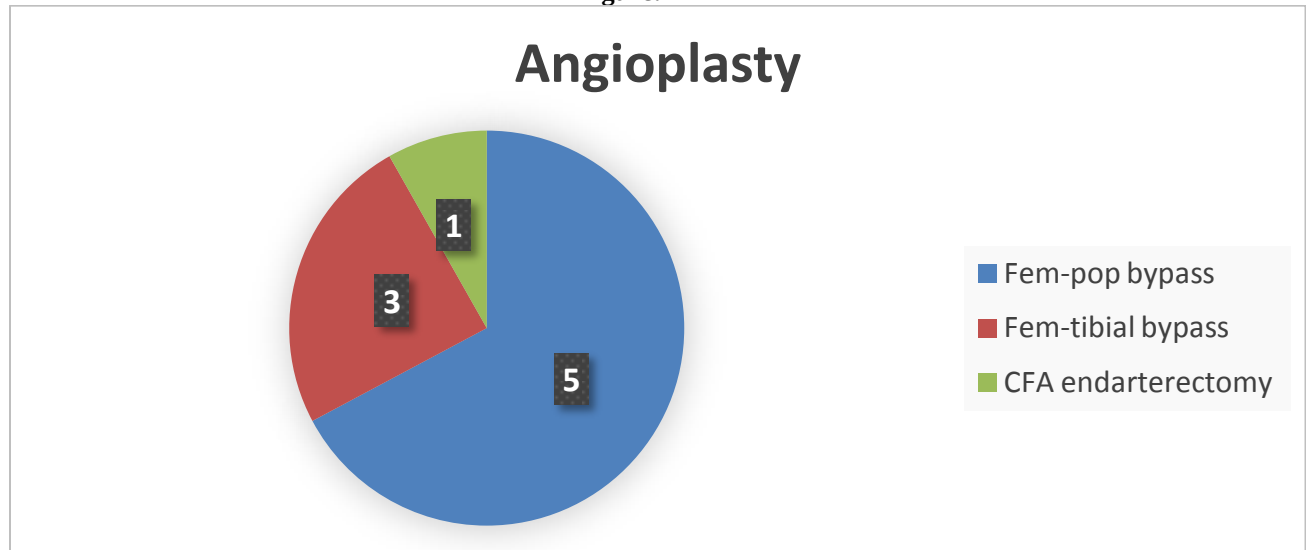
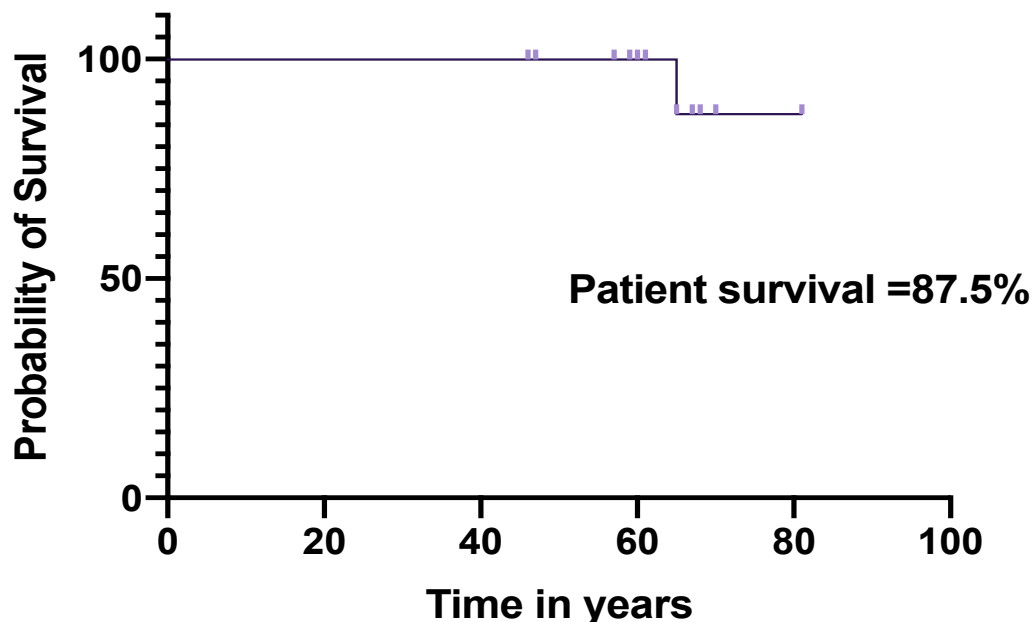
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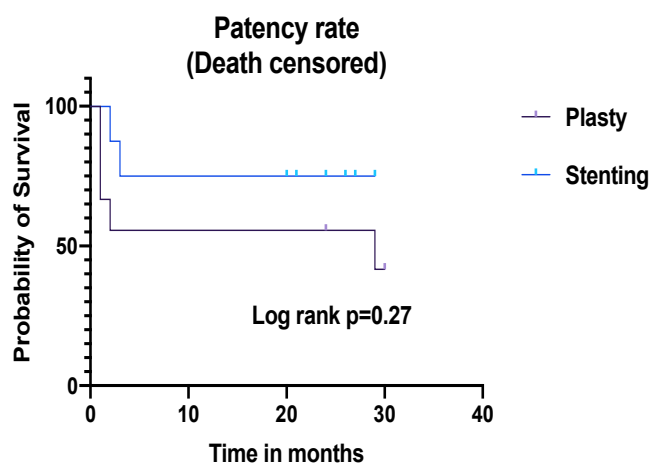
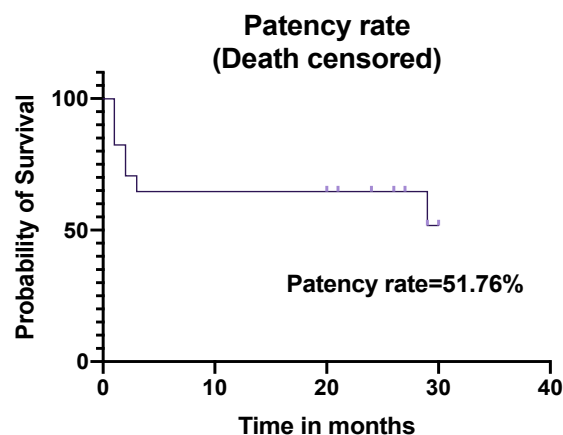
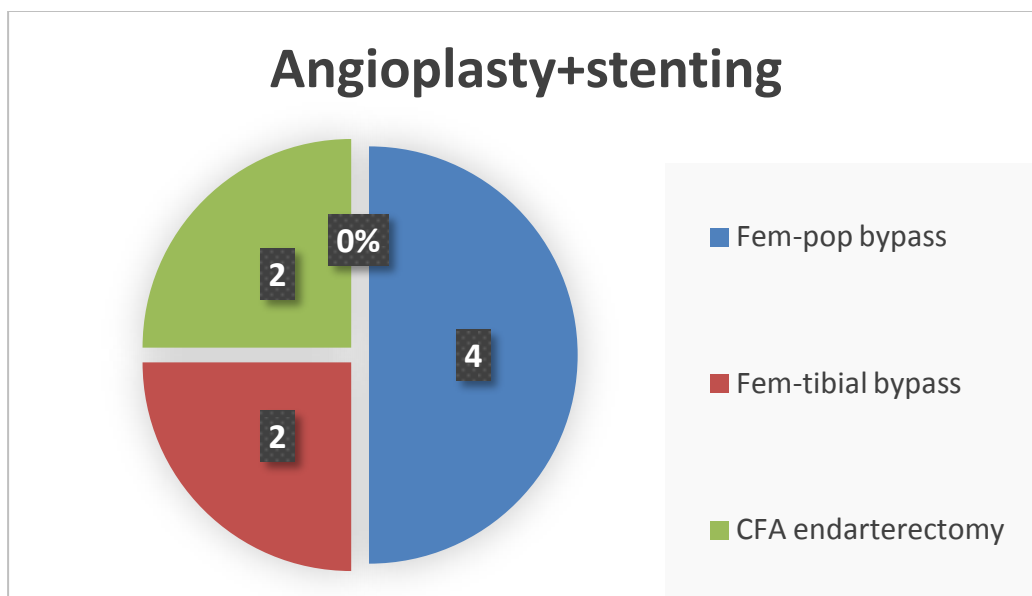
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**Results:-**

A total of 17 male patients underwent hybrid procedures during the study period. All of the patients had iliac and infra-inguinal disease with multiple arterial segments occluded. The mean age was 61 years (range-45 to 82 years). All of them were smokers. 10/17 patients had co-morbidities (Diabetes mellitus/ Hypertension/ Coronary artery disease) in varying combinations. Indications for intervention were rest pain, ulcer/gangrene. 9/17 patients had an angioplasty and the remaining patients had an angioplasty along with iliac artery stenting. The type of open vascular interventions performed in the two groups are depicted in Figures 2&3. The overall death-censored patency rate was 51.76%. The death-censored patency rates between the two cohorts were not significantly different (log rank $p=0.27$). The overall amputation rate was 29.41% (4 in Angioplasty cohort vs. 1 in Angioplasty +stenting cohort). The patient survival was 87.5%, the ulcer healing rate was 52% and ABI improved in 100% of the patients.

Figure-3:-

Patient Survival



Conclusion:-

Hybrid procedures give one-stage treatment for patients with complex multilevel steno-occlusive vascular disease. Open surgery can immediately repair inadequate endovascular results and *vice versa*. This study illustrates that in patients with significant iliac artery disease with associated infra-inguinal involvement, Hybrid procedures have favourable outcome with high patency and amputation free survival rates with reduced hospital stay/mortality.

Hybrid vascular surgical techniques give varied options and opportunities for the vascular surgeons. Rather than considering a patient in terms of suitability for open surgery or endovascular intervention, complex multilevel disease can be appraised on its merits, and each region can be treated with an approach that will best optimize outcomes and ensure safety for the patient as a whole. It is now common in most advanced CLTI centers for vascular surgeons trained in both open surgery and interventional techniques to utilize an individualized, hybrid revascularization strategy for patients with limb-threatening ischemia resulting from multilevel peripheral artery disease.

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