

Common Indications for IVC Filter Placement in Nigeria: Three Case Series

Emmanuel Auchi Edafe^{1*}, OkoroTeo¹ and Stanley KN²

¹Bayelsa Specialist Hospital, Yenagoa, Nigeria

²Department of Pharmaceutical Microbiology, University of Port Harcourt, Nigeria

Abstract

There are many reasons for Inferior Vena Cava (IVC) filter placement. Even with the expanding lists of indications, most guidelines recommend that contraindications to systemic thrombolysis or its failure may necessitate IVC filter placement. The increased use may be due to insertion of retrievable filters. We report three cases with indications for IVC filter placement.

Keywords: Inferior Vena Cava • Echocardiography • Butadiene solution • His D-dimer • Cardioverter defibrillators • Infra-renal segment • Pulmonary Embolism

Abbreviations: IVC: Inferior Vena Cava • EAE: European Association of Echocardiography • ASE: American Society of Echocardiography • DVT: Deep Vein Thrombosis

Introduction

IVC is a vein that carries deoxygenated blood from the lower limbs, pelvic and abdominal organs to the heart. According to the recommendations of American Society of Echocardiography (ASE) guidelines and European Association of Echocardiography (EAE), the IVC was described as small when the diameter was <1.2 cm, normal when the diameter measured between 1.2 and 1.7 cm, and dilated when it measured >1.7–2.5 cm, markedly dilated when it >2.6 cm. [1,2] The commonest source of pulmonary embolism is deep vein thrombosis (DVT) from the lower limb and the pelvic region. [3] An IVC filter is one method that help prevent pulmonary embolism. In this 3 case series, we report the common indications for IVC filter placement in Nigeria.

Case 1

Mr. PSCW was 86 year old man living with hypertension for 39 year and 5 years history of metastatic cancer of the prostate. He presented to the Cath lab of Bayelsa Specialist Hospital with 3 weeks history of left leg swelling and pain. His D-dimer was 2400 ng/mL. The Duplex ultrasound showed extensive thrombosis of the left superficial and common femoral veins. He was placed on warfarin 5 mg daily. He was on this dose with last INR of 2.8 within 2 weeks of DVT. He developed massive upper GI bleeding that necessitates 12 units of blood transfused in 24 hours on the 3rd week of medication. This was followed with emergency upper GI therapeutic endoscopy with injection of sclerosant on the stomach ulcer. The patient was then transfer to our cardiac catheterization laboratory for IVC filter implantation. Warfarin was stopped. Pre-procedure inform consent was taken. Packed cell volume after the 12 units of blood were transfused was 23% and Hb 7.0 g/dl, Na was 141 mmol/dl, K was 3.8 mmol/dl, urea was 3.9mmol/dl and creatinine was 72 μmol/dl.

Procedure: The right groin was prepared with butadiene solution in sterile technique. This was followed with 10mls of 2% lignocaine after draping the patient. The common femoral vein was accessed via blind puncture and the guide wire passed to the right common iliac vein. The infra-renal segment of the IVC was located with injection of 15mls of omnipaque. This was to visualize the renal vein and the IVC diameter (24 mm). The IVC filter (7F sheath, ALN

IVC filter) was placed at L₃ (infra-renal segment of the inferior vena cava) (Figure 1). The procedure was uneventful.

Post procedure: He was transfused with 3 more units of packed cells. IV antibiotics and omeprazole continued in the hospital for 1 week. He was discharged home after a week of hospital stay. The patient has been on follow up. He is clinically stable. He is on compression stocking and physiotherapy (Figure 1).

Case 2

Mr PN was 73 year old man living with T2DM and hypertension for 16 years. History of Pulmonary Embolism one year ago and on Dabigatran 150 mg twice daily. Sill on this medication, he developed left leg swelling and pain of 2 weeks. D-dimer was as 4,120 ng/ml. Dopplex ultrasound showed DVT of the left popliteal, superficial femoral vein (non-compressible and demonstrated no color flow on imaging). He was transferred to the cardiac catheterization centre of the Bayelsa Special Hospital for IVC filter placement. Informed consent was taken for the procedure

Procedure: Sterile procedure was followed. The right groin was prepared with butadiene. The right common femoral vein with a needle and accessed with blind puncture and the guide wire was passed to the IVC. Venogram was carried out with IVC diameter measurement (23.6 mm), and position of the renal veins. Deployment of the IVC filter (7F sheath, ALN IVC filter) at infra-renal segment. (Figure 2) The procedure was uneventful.

Post procedure: He was clinically stable. He continued his anti-diabetic and anti-hypertensive medications (Figure 2).

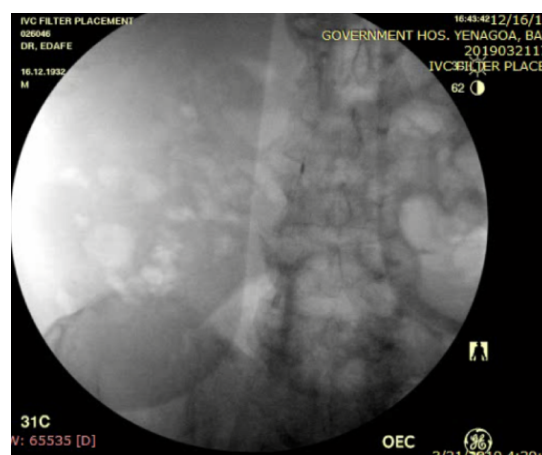


Figure 1. Infra-renal IVC segment at L₃.

*Address for Correspondence: Emmanuel Auchi Edafe, Bayelsa Specialist Hospital Nigeria; Tel: 08038735252; E-mail: dremmanueledafe@gmail.com

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Case 3

An 89 year old female living with diabetes mellitus for 30 years, hypertension for 10 years and Dyslipidemia for 8 years. Patient had left hemispheric CVD (hemorrhagic) 2 weeks. While in hospital, she developed right leg swelling and pain. Due to a contraindication to anticoagulation, retrievable inferior vena cava filter was planned for her. The D-dimer was 6300ng/ml, Informed consent was taken.

Procedure: Sterile procedure was followed. The left groin was prepared with butadiene. The left common femoral vein was accessed with blind puncture needle and the guide wire was passed to the IVC. Venogram was carried out with IVC diameter measurement (24.2 mm), and position of the renal veins. Deployment of the IVC filter (7F sheath, DENALI IVC filter) at infra-renal renal segment. (Figures 3 & 4) The procedure was uneventful.

Post-procedure: The patient continue physiotherapy, compression stocking, anti-diabetic and anti-hypertensive medications (Figures 3 & 4).

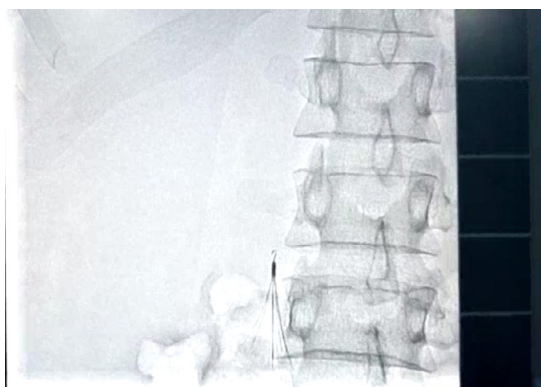


Figure 2. Infra-renal ALN IVC filter.

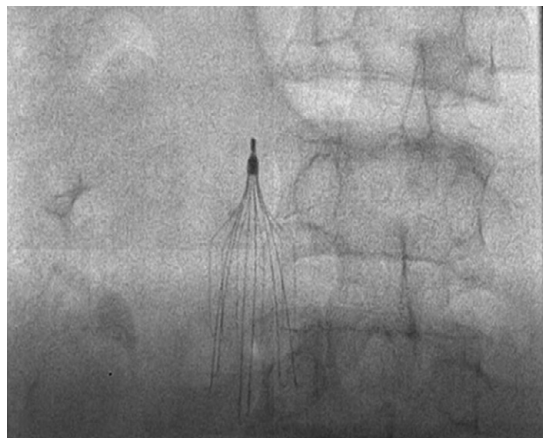


Figure 3. Infra-renal IVC filter (denali filter).



Figure 4. Post Deployment Venogram.

Discussion

Venous thromboembolism comprised Deep Venous Thrombosis (DVT) and pulmonary embolism (PE).[4] It is a continuum of a single disease process within the veins which drain blood to the right sided heart and continue to the pulmonary artery. [4] The 3 case series above had DVT with the 2nd case diagnosed with pulmonary embolism. Commonly, DVT develops within the deep veins of the lower extremities or pelvic region. [3] But, it can also arise from upper extremities or devices such as pacemaker, implantable cardioverter defibrillators, cardiac Resynchronization therapy and long term tunnel dialysis catheters. [5] Our 3 patients presented, had DVT of the lower extremities. Inferior vena cava filter is not part of the management plan for DVT from upper extremities and the cardiac devices.

The most dreaded complication of DVT is pulmonary embolism. [4] Pulmonary embolism is the frequent cause of death among patients with venous thromboembolism. [4] One patient had pulmonary embolism among the 3 patients reported. Death is associated with serious underlying disease in approximately 50% of patients with pulmonary embolism [6].

The main stay of DVT and pulmonary embolism is Systemic anticoagulation with intravenous heparin followed by oral warfarin or Non-Vitamin K antagonist oral anticoagulants (NOAC). However, as many as 33% of patients will develop a second PE while receiving adequate anticoagulation therapy.[7] The second case reported developed pulmonary embolism while on oral anticoagulation. Also, anticoagulation therapy is associated with bleeding. This limit its use in certain groups of high-risk patients, including patients at high risk for falling, hemorrhagic stroke, metastatic disease, or bleeding diathesis. The first case was on warfarin after DVT. But he developed massive upper GI bleeding that necessitated 12 units of packed cell transfusion within 24 hours. The third patient had hemorrhagic stroke and while being managed in the hospital developed DVT.

The indications for IVC filter placement have expanded over the years. However, the main indications still remain DVT or PE in a patient for whom anticoagulation therapy is contraindicated, accounting for 38-77% of patients undergoing IVC filter placement. [8] Our 3 cases reported had contraindications to anticoagulation, hence the need for IVC filter.

The contraindications to anticoagulation therapy are hemorrhagic stroke, recent neurosurgical procedures, major or multiple trauma, active internal bleeding (examples include upper or lower gastrointestinal bleeding, hematuria, hemobilia), Intracranial neoplasm, Bleeding diathesis (examples include secondary thrombocytopenia, idiopathic thrombocytopenic purpura, hemophilia). [9] The first case had massive upper GI bleeding while on anticoagulation for DVT. The second case had pulmonary embolism and DVT while on anticoagulation. The third case had had hemorrhagic stroke and DVT.

The concern about the possibility of IVC filter precipitating renal vein thrombosis has prompted many to recommend that vena cava filters be placed in the infra-renal portion of the inferior vena cava. [10] The 3 patients reported had infra-renal IVC filters. Supra-renal IVC filter placement is a valuable technique that help to prevent pulmonary embolism in patient that have indication for IVC filter but contraindication to infra-renal placement.

Conclusion

IVC filter placement is a valuable technique that help to prevent pulmonary embolism in patient with DVT and have contra-indication for anticoagulation or its failure.

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How to cite this article: Emmanuel Auchi EDAFE, OkoroTeo and Stanley KN, "Common Indications for IVC Filter Placement in Nigeria: Three Case Series." *J Interv Gen Cardiol* 5 (2021): 123.