J. Cardiovasc Disease Res., 2020; 11(2): 144 – 148
A Multifaceted Peer Reviewed Journal in the field of Cardiology
www.jcdronline.org | www.journalonweb.com/jcdr
P – ISSN: 0975 – 3583 Online: 0976 – 2833

First Experience of IVC Filter Use in Al-Shaheed Ghazi Al-Hariri Hospital for Surgical Specialties in Baghdad, Iraq

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ABSTRACT

Introduction: thromboembolism of vein, deep vein thrombosis (DVT) besides its main problem pulmonary embolism (PE) disturbs 1 to 2 /1000 yearly, and it is a foremost cause of avoidable hospital mortality in the United States. Although DVT is approximately two times as frequently as PE, the death rate of PE in one month is dual that of DVT.

Method: The peripheral intervention unit is an affiliate of the Vascular Surgery branch at the Al-Shaheed Ghazi Al-Hariri Hospital for surgical specialties and is part of the Medical City Complex in Baghdad. Patients selected for placement of the inferior vena cava filter are referred through the peripheral intervention-consulting clinic. Patients are chosen according to the internationally agreed device placement criteria. This study was conducted for the period from March 2015 to March 2017.

Results: 58 patients with VTE mean age of them (49.6 ± 15.6) years old, 60 % of male with IVC filter and 40% of female with IVC filter. 53% of patients with filter old age while 44.8% of patients with IVC filter middle age group. 98% of patients with IVC filter have history of venous thrombosis, 55% of patients with ICV filter have surgery for 2 months, 7% of patients with IVC filter have symptoms of pulmonary embolism while 0% of patients with filter have complication after operation like bleeding. Significant association between gender, age, surgery for 2 months and respond of patients with pulmonary embolism to IVC with filter. Significantly, there is no any complication after IVC filter insertion in patients with PE. History of venous thrombosis not significantly associate with IVC filter or without it and symptoms of pulmonary embolism found not significantly associate with IVC filter or without it.

Conclusion: IVC filter insertion with image directed is significant in management and prophylaxis of VTE patients. Newly procedure is accessible; Doctors became well trained and contented with IVC filters.

Key words: IVC filter, Al-Shaheed Ghazi Al-Hariri Hospital, Baghdad, Iraq.

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Submitted: 25-04-2020
Revision: 27-05-2020
Accepted Date: 22-06-2020

DOI: 10.31838/jcdr.2020.11.02.22

INTRODUCTION

Thromboembolism of vein, deep vein thrombosis (DVT) besides its main problem pulmonary embolism (PE) disturbs 1 to 2 /1000 yearly, and it is a foremost cause of avoidable hospital mortality in the United States [1]. DVT have double frequent as PE and double death rate [2]. Internationally anticoagulant is more preferred in management of VTE [3]. Disruption of vena cava occur by insertion IVC filter with percutaneous radiological guided so it is main role in management of patients with VTE [4]. Indication of IVC filter are any anticoagulation contraindication, VTE complications or there is no enough defense from VTE [4]. IVC filters are divided into 2 general types: permanent and retrievable (optional). Permanent IVC filters are designed to persist within the patient for the period of their lifetime and have no facility of removal. Retrievable IVC filters (removable or optional) are specifically engineered to allow for retrieval once VTE risk has passed. If recovered, these expedients suggestion the decrease of long-term problems related with stable IVC filters [5]. The indication of IVC filter are patients have; VTE with common indication, VTE with prolonged indication and VTE with no main treatment for PE.

Common indication of IVC filter location include VTE with: anticoagulant contraindication, any problems in anticoagulant that need to stop it, anticoagulation failure, spread and/or development of DVT during anticoagulant treatment [4]. Prolong indication of IVC filter location include VTE with: big free detached proximal DVT or Iliocaval, incapability to complete/keep suitable anticoagulation, Huge PE with lasting DVT in patients with danger for more PE, chronic embolism managing with thromboendarterectomy, VTE with incomplete cardiopulmonary standby, repeated PE with IVC filter, poor response to anticoagulant and increase danger of anticoagulation problems (falling) [4]. Prophylactic treatment of IVC filter in patients with VTE: 1. Trauma patient with high risk of VTE, 2. Surgical procedure in a patient at high risk for VTE, and 3. Medical condition with high risk of VTE [4]. Therefore, the indications for IVC filter placement are therapeutic and prophylactic [6]. Entire contraindication for IVC located is loss entree to IVC. While relation contraindication are; unbalanced coagulation, IVC thrombosis, sepsis or bacterial growth, caval <15 mm in diameter [7].

IVC filter placement complications; fracture especially Cordis OptEase besides TrapEase filters, incomplete or complete IVC closure, IVC damage more with transient apparatus (70%) than dominant apparatus (15%), penetration include 68% of retroperitoneal buildings of transient device and 5% in dominant device P< 0.0001 [8]. The internal jugular vein (IJV), subclavian vein (SCV), and the common femoral vein (CFV), are used for puncture for IVC filters placement in majority of cases. Doppler guided access used to achieve a vein perforation. And the method of insertion is either Fluoroscopy-guided or US-guided sometimes [9]. The jugular approach is preferable if an Ilio-femoral or saddle thrombus is present. Some filters are

exclusively designed for right jugular vein due to loss of free in transfer system. IVC used if diameter < 3cm. The majority of IVC filters has similar conical-shapes with legs ("struts") projecting out from the base ("head"). Models come in both a jugular or femoral version, depending on which location the surgeon is implanting the filter. Bard, Cook, Boston Scientific (Greenfield), Cordis, B. Braun, Argon, and ALN, all are well known manufacturers of IVC filters [10]. The aim of study is to show effectivity of IVC with filter on patients with PE and what the variables associate with this effectivity are.

METHOD

The peripheral intervention unit is an affiliate of the Vascular Surgery branch at the Al-Shaheed Ghazi Al-Hariri Hospital for surgical specialties and is part of the Medical City Complex in Baghdad. Patients selected for placement of the inferior vena cava filter are referred through the peripheral intervention-consulting clinic. Patients are chosen according to the internationally agreed device placement criteria. This study was conducted for the period from March 2015 to March 2017

Inclusion criteria: any patient with thromboembolism and one of the following

- Contraindication to use of anticoagulants
- in spite of anticoagulation there is an evidence of recurrent PE
- Complications occur as a result of use of anticoagulants

Exclusion criteria: cases were excluded from this study if they have

- Unbalanced coagulation
- Entirely thrombosed IVC
- Bacterial growth, sepsis, or serious infection
- IVC <15 mm in diameter.

An informed consent was obtained, renal function was reviewed and Contrast allergy was excluded .The IVC Filter was used in all procedures is Denali™ Vena Cava Filter (Bard Peripheral Vascular, Inc), Jugular/Subclavian Delivery Kit. Standard sterile technique with chlorhexidine or povidone iodine solution and lidocaine 2% local anesthetic were used for all procedures. Venous puncture was carried out under Doppler guidance with a 19-G needle. A right internal jugular vein (IJV) or subclavian vein approach was used as approach in all procedures. Under Fluoroscopy-guide, 0.035- or 0.038-in Guide wire passed to IVC then filter sheath was advanced. Venogram was checked to adjust the place of deployment of filter. Filter deployed according to manufacturer deployment technique guidelines. venogram done again ,and lastly the remaining of delivery system was withdrawn .with pressure on site of access to complete hemostasis. Patients were followed up to find out the outcome of applying the filter, through their visits to the consultation clinic , where necessary examinations were carried out to exclude the occurrence of pulmonary embolism or any other problems by examining them both radiologically and clinically. Statistical study done by SPSS 22 for calculate frequency, percentage, mean and SD of all data, Chi square use to show association between variables and patients satisfaction (categorical data). P-value considered significant when ≤ 0.05.

RESULTS

Cross sectional study of 58 patients with VTE mean age of them (49.6 ± 15.6) years old, 60 % of male with IVC filter and 40% of female with IVC filter. 53% of patients with filter old age while 44.8% of patients with IVC filter middle age group. 98% of patients with IVC filter have history of venous thrombosis, 55% of patients with ICV filter have surgery for 2 months, 7% of patients with IVC filter have symptoms of pulmonary embolism while 0% of patients with filter have complication after operation like bleeding. As show in table (1).

Table 1: variables distribution

Gender		**IVC filter with**	**without**
Male	Count	35	22
	%	60.3%	37.9%
Female	Count	23	36
	%	39.7%	62.1%
Total	Count	58	58
	%	100.0%	100.0%
Age		**IVC filter with**	**without**
13-39 years (young adult)	Count	1	33
	%	1.7%	56.9%
40-59 years (middle adult)	Count	26	20
	%	44.8%	34.5%
more than 60 years (old)	Count	31	5
	%	53.4%	8.6%
Total	Count	58	58
	%	100.0%	100.0%
Any complications or bleeding		**IVC filter with**	**without**
Yes	Count	0	7

	%	0.0%	12.1%
No	Count	58	51
	%	100.0%	87.9%
Total	Count	58	58
	%	100.0%	100.0%

From table (2) there is significant association between gender and respond of patients with pulmonary embolism to IVC with filter; 60 % of male with IVC filter and 40% female. In addition, there is significant association between age and respond of patients with pulmonary embolism to IVC with filter; 53% of patients with filter were old age and 44.8% of them middle age.

There is significant association between surgery for 2 months and respond of patients with pulmonary embolism to IVC with filter; 55.2% of patients with filter have surgery for two months and 44.8% of them have not. Significantly, there is no any complication after IVC filter insertion in patients with PE.

History of venous thrombosis not significantly associate with IVC filter or without it and also symptoms of pulmonary embolism found not significantly associate with IVC filter or without it.

Table 2: association between variables and IVC filter.

Gender		**IVC filter with**	**without**	**P-value**
male	Count	35	22	
	%	60.3%	37.9%	
female	Count	23	36	0.013
	%	39.7%	62.1%	
Total	Count	58	58	
	%	100.0%	100.0%	
Age		**IVC filter with**	**without**	**P-value**
13-39 years (young adult)	Count	1	33	
	%	1.7%	56.9%	
40-59 years (middle adult)	Count	26	20	0.0001
	%	44.8%	34.5%	
more than 60 years (old)	Count	31	5	
	%	53.4%	8.6%	
Total	Count	58	58	
	%	100.0%	100.0%	
Symptoms of pulmonary embolism		**IVC filter with**	**without**	**P-value**
yes	Count	4	10	
	%	6.9%	17.2%	
no	Count	54	48	0.8
	%	93.1%	82.8%	
Total	Count	58	58	
	%	100.0%	100.0%	
Any complications		**IVC filter with**	**without**	**P-value**
Yes	Count	0	7	
	%	0.0%	12.1%	
No	Count	58	51	0.006
	%	100.0%	87.9%	
Total	Count	58	58	
	%	100.0%	100.0%	

P-value less than 0.05 (significant).

DISCUSSION

The placement and retrieval of IVC filters have been growing in the post-2010 FDA accreditation time. However, there is still little evidence to support its use [11]. The number of patients undergoing the IVC filter placement is increasing steadily, but the ages of these patients are still advanced, as most of them are of middle age and more. Most indications necessity the placement of the IVC filter was prophylactic, and this result is compatible with the Australian first trial study where the indication was prophylactic also [12]. In current study there is significant association between age and respond of patients with pulmonary embolism to IVC with filter; 53% of patients with filter were old age and 44.8% of them middle age. These results similar to another study stated that IVC is harmless and active in patients > 65 years old. Age by

yourself is a poor indicator of a clinical chance to eliminate a filter. After follow up retrieval rates in young patients can be reached [13]. Tao et al. agree also with our results that age was the only significant demographic predictor of filter removal as those with unremoved filters were slightly older (62.7 years) than those with removed filters (59.6 years) [14]. In current study, there is significant association between gender and respond of patients with pulmonary embolism to IVC with filter; 60 % of male with IVC filter and 40% female. This also agree with Tao et al. that and 53.3% were male and 47% was female with significant response to filter by male more than female. In addition, Shabib AB et al. agreed with our study and state that patients (225, 58.9% male and 157, 41.1% female) received IVC filters [14, 15]. In current study, more than 50% of patients with filter have history of surgery for two months and response to treatment. Complications of thromboembolic still increase morbidity in addition to mortality after surgery. After any surgery or trauma, significant evaluation and prophylaxis give for DVT and PE [16]. The problems occur after spine operation, and there is a little data about danger and inhibition [17, 18]. The greatness of the pulmonary embolism occur after 1 day after surgery, danger features that have been related with PE/DVT include distance of the surgical process, lying status, in front reach to spine, time without moving after surgery and motor neurological defect in lower limbs. IVC filter insertion in these patients for 2 years pre operation have been comfortable, and PE fine recognized in post filter putting [19]. IVC filter more effective at 12 days with actual difference between patients with filter than without it in PE [20]. In current study significantly there are no any complication occur in patients with IVC filter like bleeding or infection this similar to other study show no other major complications were observed [21].

Complications from IVC filter placement occurred in 79 patients (20%). Of these complications, 72 were thrombotic while seven were mechanical and related to the IVC filter. Overall, 13 (3%) patients in our cohort developed or had recurrent PE despite having an IVC filter *in situ*. Of these patients, only six patients were not being treated with prophylactic or therapeutic anticoagulation [15]. Complications is very variable, 0%-69%, and mortality rate 4% of patients [22, 23], late problems of IVC filters may include repeated pulmonary embolism (2% to 6%), IVC thrombosis (4% to 30%), DVT (6% to 32%), and filter passage (3% to 69%) [24]. In current study history of venous thrombosis, not significantly associate with IVC filter or without it and symptoms of pulmonary embolism found not significantly associate with IVC filter or without it. HERVÉD et al. agreed with our study that state; although no significant interaction was found between the uses or nonuse of a filter and the use of low molecular weight or unfractionated heparin, the initial beneficial effect of filters with concomitant low-molecular-weight heparin remains to be assessed. A long-lasting filter used decrease PE with no any problems. No different between fast and long term management and after 2 years may highly cause of DVT due to thrombus at filter location [21].

CONCLUSION

IVC filter insertion with image directed is significant in management and prophylaxis of VTE patients. Newly procedure is accessible; Doctors became well trained and contented with IVC filters.

CONFLICT OF INTEREST

None

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Cite this article: Abdulameer Mohsin Hussein First Experience of IVC Filter Use in Al – Shaheed Ghazi Al – Hariri Hospital for Surgical Specialties in Baghdad, Iraq. J. Cardiovascular Disease Res. 2020; 11 (2): 144 – 148