MANAGEMENT OF VENOUS HYPERTENSION IN THE UPPER LIMBS AS A COMPLICATION OF ARTERIO-VEOUS ACCESS FOR HAEMODIALYSIS

Essay

Submitted for Partial Fulfillment of Master Degree in General Surgery

By

Joseph Ayoub Asaied

M.B., B.Ch.

Supervised By

Prof. Dr. Mahmoud Sobhy Khattab

Professor of General Surgery & Vascular Surgery

Faculty of Medicine – Ain Shams University

Prof. Dr. Sherif Mohamed Essam El Din

Assistant Prof. of General & Vascular Surgery

Faculty of Medicine – Ain Shams University

Dr. Abdel Rahman Mohammed Ahmed

Lecturer of General & Vascular Surgery

Faculty of Medicine – Ain Shams University

Faculty of Medicine

Ain Shams University

2016

Acknowledgement

Thanks to ALLAH, most merciful and most compassionate. I express my at most gratitude to all those who contributed in this work, by guidance, support, and help.

I am deeply indebted to **Prof. Dr. Mahmoud Sobhy Khattab**, Professor of Vascular and General surgery, Faculty of Medicine Ain Shams University, for his constant support, influential criticism, and continuous help and follow up of the manuscript of this essay.

I am deeply indebted to **Prof. Dr. *Sherif Mohamed Essam El Din*** Professor of Vascular and General surgery, Faculty of Medicine Ain Shams University, for his constant support, influential criticism, and continuous help and follow up of the manuscript of this essay.

I would like to express my deep gratitude **Dr. Abdel Rahman Mohammed Ahmed**, Lecturer of Vascular and General surgery, Faculty of Medicine, Ain Shams University, for his patience, endless help, kind support, valuable remarks, continuous encouragement and close supervision throughout the whole essay.

Without the support and guidance of my supervisors this work could never be accomplished.

Finally, I would like to dedicate this work to my parents who sacrificed a lot to guarantee marvelous career for myself, who are always there during the hard days of completion of this essay.

Abbreviations

- ACT: activated clotting time.
- APP: assisted primary patency.
- A-V: arteriovenous.
- AVF: arteriovenous fistula.
- BMS: bare metal stents.
- BRAVO: Beta Radiation for Treatment of Arterial-Venous Graft Outflow.
- CSs: Covered stents.
- CVOD: central venous occlusive disease.
- DES: drug eluting stents.
- DUS: duplex ultrasound.
- DVT: deep venous thrombosis.
- ESRD: end stage renal disease.
- FSA: fibrin sheath angioplasty.
- HD: hemodialysis
- HeRO: Hemodialysis Reliable Outflow.
- IJV: internal jagular vein.
- ISR: In-Stent Restenosis.
- IVUS: intravascular ultrasound.
- LIV: left innominate vein.
- MRV: Magnetic resonance venography
- MSA: minimum stent area.
- NH: Neointimal hyperplasia.
- NO: nitric oxide.

- OV: outflow vein.
- PCB: Peripheral Cutting Balloon.
- PP: primary patency.
- PTA: percutaneous transluminal angioplasty.
- PTFE: polytetrafluoro-thylene.
- PVR: peripheral vascular resistance.
- RF: radiofrequency.
- SCV: subclavian vein.
- SP: secondary patency.
- SVC: superior vena cava.
- V-HTN or VH: venous hypertension.
- WSS: wall shear stress.

List of Figures

Table of contents

Abstract

Central venous occlusive disease (CVOD) remains a significant problem in the long-term management of hemodialysis patients. The correlation between Central venous catheterization use and central vein stenosis has been well documented .The most definitive but simultaneously drastic surgical remedy is ligation of the access. Endovascular intervention for hemodialysis-related Central venous occlusive disease remains the present mainstay of treatment. . PTA has shown variable technical success of 70% to 90% and variable 6- and 12-month patency rates. Bare metal stents are the second-generation technology and the second-line treatment of Central venous occlusive disease. Future treatments may include coated drug eluting stents with biologic active coating to improve endothelial healing inside the stent and limit neointimal hyperplasia. Central venous occlusive disease can be addressed through extra-anatomic bypass.

Key words: - catheter, venous, occlusion, hypertension, stent, bypass.

Introduction

Introduction

Central venous occlusive disease (CVOD) remains a significant problem in the long-term management of hemodialysis patients. CVOD disrupts the hemodialysis access circuit by causing venous hypertension and access flow dysfunction, with or without debilitating symptoms in the ipsilateral limb. The use of temporary access catheters and lack of an adequate preoperative strategy to select an appropriate access site has resulted in a significant increase of CVOD during the last decade, and the management of this complication is becoming an integral part of vascular practice. **(Kundu S. 2010)**

The correlation between Central venous catheterization use and central vein stenosis has been well documented in multiple series and affects up to half of all patients with a history of Central venous catheter placement. **(Joshua C. et al., 2014)**

Despite concerted efforts to promote placement of autogenous arteriovenous fistulas before the commencement of dialysis, the rate of central venous catheter use in the first 90 days of initial treatment is still surprisingly high, at nearly 80%. **(Vassalotti JA et al., 2012)**

The likely cause of central venous occlusive disease is the development of venous intimal hyperplasia from chronic trauma caused by repeated catheterization for interim access in addition the high-flow turbulent flow from an existing arteriovenous access may contribute to the development of stenosis. **(Anaya-Ayala JE et al., 2011)**

In the HD-dependent demographic, central vein stenosis typically manifests as extremity swelling, breast engorgement, and prominent superficial veins ipsilateral to a functioning fistula or graft. **(Joshua C. et al., 2014)**

Given the importance of reliable vascular access in hemodialysis patients, central vein disease presents a challenging problem to the vascular surgeon. Once the stenosis progresses to frank obstruction, maintaining a functional arteriovenous fistula becomes problematic. **(Agarwal A.K. et al., 2007)**

The most definitive but simultaneously drastic surgical remedy is ligation of the access. However, reducing the flow in large AVFs by using one of several reported plication techniques may reduce the patient's symptoms and swelling. **(Jennings WC et al., 2012)**

Endovascular intervention for hemodialysis-related Central venous occlusive disease remains the present mainstay of treatment. These options include PTA and placement of bare metal stents. PTA has shown variable technical success of 70% to 90% and variable 6- and 12-month patency rates. Bare metal stents are the second-generation technology and the second-line treatment of Central venous occlusive disease. They provide the mechanical support to a site of stenosis that is resistant to PTA with high technical success (100%) in all reports. Bare metal stents have significant limitations, however, and after the deployment they may migrate, shorten, or fracture at a subacute or delayed stage. **(Javier E. et al., 2011)**

Central venous occlusive disease can be addressed through extra-anatomic bypass, including jugular vein turn down procedures, subclavian vein to external or internal jugular vein bypass, or axillary to femoral vein bypass. **(Chandler et al., 2002)**

Aim of the work

Aim of the Work

To highlight the incidence, etiology, diagnosis and treatment of venous hypertension as a complication of arterio-venous fistula.