شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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Role of Ultrasound and Dynamic Contrast MRI Study in Diagnosis of Soft Tissue Vascular Anomalies in Pediatric Age Group

Thesis

Submitted for Partial Fulfillment of
Master Degree in ***Radio Diagnosis***

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Amira Ismail Ahmed

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List of Abbreviations

Abb.	Full term
AVF	*Arteriovenous fistula*
AVM	*Arteriovenous malformation*
CA	*Contrast agent*
CE	*Contrast enhancement*
CE-MRA	*Contrast-enhanced MRA*
CH	*Congenital hemangioma*
CHF	*Congestive heart failure*
CM	*Capillary Malformation*
CVM	*Capillary-venous malformation*
DCE MRA	*Dynamic contrast-enhanced MRA*
FAVA	*Fibro-adipose vascular anomaly*
FS	*Fat saturation*
FSE	*Fast spin echo*
Gd	*Gadolinium*
GLUT1	*Glucose transporter protein isoform 1*
GRE	*Gradient Echo*
HHT	*Hereditary hemorrhagic telangiectasia*
IH	*Infantile hemangioma*
ISSVA	*International Society for the Study of Vascular Anomalies*
IV	*Intravenous*
KHE	*Kaposiform hemangioendothelioma*
KTS	*Klippel-Tre´naunay syndrome*
LM	*Lymphatic malformation*
LVM	*Lymphatic-venous malformation*
m/sec	*Milliliters/second*
MIP	*Maximum-intensity projection*
MR	*Magnetic resonance*
MRA	*Magnetic Resonance Angiography*

List of Abbreviations **cont...**

Abb.	Full term
MRE	*Maximum relative enhancement*
MRI	*Magnetic resonance imaging*
NCE-MRA	*Non contrast-enhanced Magnetic Resonance*
NICH	*Non involuting congenital hemangioma*
NPV	*Negative predictive value*
PHACES syndrome	*Posterior fossa malformations, hemangiomas, arterial anomalies, cardiac defects, eye abnormalities, sternal cleft, and supraumbilical raphe syndrome*
PICH	*Partially involuting congenital hemangioma*
PPV	*Positive predictive value*
PWS	*Parkes Weber syndrome*
RICH	*Rapidly involuting congenital hemangioma*
ROIs	*Regions of interest*
SE	*Spin echo*
Sec.	*Second*
SI	*Signal intensity*
STIR	*Short time inversion recovery*
SWS	*Sturge Weber Syndrome*
T1-W	*T1 weighted*
T2-W	*T2 weighted*
US	*Ultrasonography*
VA	*Vascular anomaly*
VM	*Venous malformation*
VS	*Versus*

INTRODUCTION

Vascular anomalies (VAs) comprise a wide heterogeneous spectrum of lesions that can cause significant morbidity and even mortality in both adults and children. Vascular lesions represent the most common cause of pediatric soft-tissue masses ***(Flors et al., 2011).***

In the past, this subject has been obscured by considerable confusion due to use of an unclear nomenclature. The term hemangioma has been applied generically to vascular lesions of differing cause and clinical behaviour. This confusion continues to be responsible for improper diagnosis and subsequent treatment. Since treatment strategy depends on the type of malformation, correct diagnosis and classification of a vascular anomaly are crucial ***(Kollipara et al., 2013).*** This can be achieved on the basis of an accurate clinical history and physical examination combined with imaging targeted at specific information required for treatment planning, especially in cases of unclear classification or extension of the lesion ***(Wassef et al., 2015).***

In 1982, Mulliken and Glowacki proposed a binary classification system of vascular anomalies which was later revised and adopted by the international society for the study of vascular anomalies (ISSVA). This system divides vascular anomalies into two broad biologic categories: vascular or vasoproliferative neoplasms and vascular malformations.

Vascular, or vasoproliferative, neoplasms have increased endothelial cell turnover, which means they undergo mitosis. In contrast, malformations are not neoplasms and thus do not exhibit mitosis or increased endothelial cell turnover. Instead, vascular malformations are defined as structural abnormalities of the capillary, venous, lymphatic, and arterial system that grow in proportion to the child ***(Mulligan et al., 2014).***

Vascular or vasoproliferative tumors are subdivided on the basis of presence or absence of endothelial cell glucose transporter 1 (GLUT1) isoform protein. Infantile hemangiomas and angiosarcomas express GLUT1 protein, whereas congenital hemangiomas and kaposiform hemangioendotheliomas do not. Vascular malformations are subdivided into slow- versus fast- (or low- vs. high-) flow malformations. Slow-flow malformations include various combinations of venous, capillary, and lymphatic elements, whereas fast flow malformations must contain an arterial component ***(Flors et al., 2011)***.

Gray-scale ultrasonography coupled with color Doppler imaging and spectral analysis is the initial screening imaging modality at some centers for vascular malformation given the low cost, fast and real-time information, and lack of ionizing radiation. As it provides information about the degree of vascularity of a lesion thus aid in hemodynamic classification of vascular malformations into high-flow and low-flow lesions. However, ultrasonography has the disadvantages of a limited