Ultrasound-guided celiac plexus neurolysis in advanced upper abdominal cancer pain

Thesis

Submitted for partial fulfillment of MD degree in Radiodiagnosis

Presented by

Mohammed Abbas Abdel Salam Deif
(M.Sc. Radiodiagnosis)

Under the supervision of

Prof. Dr. Hana Hamdy Nassef
Professor of Radiodiagnosis
Faculty of Medicine, Ain-Shams University

Prof. Dr. Omnia Ahmed Kamal
Professor of Radiodiagnosis
Faculty of Medicine, Ain-Shams University

Prof. Dr. Osama Lotfy Elabd
Professor of Radiodiagnosis
National Liver Institute, Elmenufiya University

Dr. Mary Yaftah Tadros
Lecturer of Radiodiagnosis
Faculty of Medicine, Ain-Shams University

Faculty of Medicine
Ain Shams University
2014

Acknowledgement

First of all, praise to ALLAH, the master of the world, most gracious, most merciful.

I owe a particular debt to **Prof. Dr. Hana Hamdy Nassef,** *Professor of radio diagnosis, faculty of medicine, Ain-Shams University for her sincere advices, scientific observations and wise guidance that were so valuable in completion of this work.*

I am also much obliged and can hardly express my endless thanks and greatest pleasure to **Prof. Dr. Omnia Ahmed Kamal** *Professor of radio diagnosis, faculty of medicine, Ain-Shams University for her continuous support, step by step guidance, meticulous revision and precious remarks.*

My deepest appreciation and extreme gratitude to **Prof. Dr. Osama Lotfy Elabd** *professor of radio diagnosis, National Liver Institute, Menoufiya University for his sincere support and wise guidance all through this work.*

I would like to express my profound gratitude, appreciation and endless thanks to **Dr. Mary Yaftah Tadros** *Lecturer of radio diagnosis, faculty of medicine, Ain-Shams University for her precious remarks, kind encouragement, meticulous revision and step by step guidance.*

Special thanks and gratitude to my wife and family for their extreme encouragement and support through this work.

Mohammed Abbas

CONTENTS

List of Figures

LIST OF TABLES

LIST OF ABBREVIATIONS

COX	Cyclooxygenase
CPB	Celiac plexus block
CPN	Celiac plexus neurolysis
CSF	Cerebrospinal fluid
CT	Computed tomography
ECG	Echocardiogram
EUS	Endoscopic ultrasound
EUSG-CPB	EUS-guided celiac plexus block
FG-CPB	Fluoroscopy-guided celiac plexus block
G	Gauge
HCC	Hepatocellular carcinoma
Hz	Hertz
IASP	International Association for the Study of Pain
IDDS	Intrathecal drug delivery system
IV	Intravenous
IVC	Inferior vena cava
MHz	Megahertz
ml	Milliliter
mm	Millimeter
NCPB	Neurolytic celiac plexus block
NRS	Numerical rating scale

NSAIDs	Non steroidal anti-inflammatory drugs
PV	Portal vein
QQL	Quality of life
SD	Standard deviation
Sec	Second
SMA	Superior mesenteric artery
US	Ultrasound
VAS	Visual analog scale
WHO	World Health Organization

INTRODUCTION

Cancer-related pain remains a prevalent problem in oncologic practice and has major implications in patient comfort, tolerance of oncology therapies, and probably survival **(*Brogan and Junkins*; 2010).**

Timely interventional cancer pain therapies complement conventional pain management by reducing the need for high-dose opioid therapy and its associated toxicity ***(Brogan and Junkins; 2010).***

Abdominal viscera, including pancreas, liver, gallbladder, adrenal, kidney, and the gastrointestinal tract from the level of the gastro-esophageal junction to the splenic flexure of the colon are innervated via the celiac plexus. Thus, painful tumors in these viscera may have pain relieved through the use of a neurolytic celiac plexus block ***(Polati et al., 2008).***

The celiac plexus is a dense network of autonomic nerves that lies anterior to the aorta and the crus of the diaphragm at L1 level. The plexus extends for few centimeters in front of the aorta surrounding the celiac trunk and the superior mesenteric artery (SMA) ***(Narouze and Gruber; 2011).***

Celiac plexus neurolysis (CPN) refers to permanent ablation of the celiac plexus. This is done with alcohol or

phenol and usually performed for malignant disease ***(Penman; 2009).***

The most common application of neurolytic celiac plexus block is upper abdominal malignancy, especially pancreatic cancer; this was first described by Kappis in 1914 ***(Narouze and Gruber; 2011).***

Classically, the fluoroscopy-guided posterior approach to the celiac plexus block has been used. Other approaches that have been utilized are: the ultrasound-guided computed tomography (CT)-guided and the endoscopic ultrasound (EUS)-guided approaches ***(Bhatnagar et al, 2012).***

Ultrasound (US) is an increasingly used imaging technique in interventional pain management. It allows the identification of soft tissues, vessels and nerves, without exposing patients and personnel to radiation. Imaging can be performed continuously and the fluid injected is visualized in a real time fashion **(*Siegenthaler et al*, 2010).**

The bedside ultrasound-guided anterior approach to celiac plexus neurolysis is a fast, safe, and cost-effective method that can be a helpful procedure to achieve analgesia in selected patients for good quality of life in the advanced stages of upper abdominal cancers ***(Bhatnagar et al, 2008).***

Contra-indications are few and include inability to visualize anatomical landmarks because of distorted

anatomy, large tumour mass, colonic distension and eccentric origin of the celiac artery. Coagulopathy is also a contra-indication ***(Penman; 2009).***

Hypotension, back pain and diarrhea are the expected side effects of this treatment ***(Blinderman; 2008).***

AIM OF THE WORK

To evaluate the efficacy of ultrasound-guided celiac plexus neurolysis in controlling pain in patients with upper abdominal cancer pain.

ANATOMY

The celiac plexus is a dense network of autonomic nerves that is situated retroperitoneally in the upper abdomen. It lies anterior to the aorta and the crus of the diaphragm at L1 level. The plexus extends for few centimeters in front of the aorta surrounding the celiac trunk and the superior mesenteric artery (SMA) ***(Rana et al., 2014).***

The celiac plexus is the largest visceral plexus. It serves a relay center for nociceptive impulses that originate from the upper abdominal viscera, from the stomach to the proximal transeverse colon ***(Kambadakone et al., 2011).***

It is usually around the level of the L1 vertebra but may vary from T12 to L2. The location of the celiac plexus in relation with the celiac artery tends to be more consistent compared to the vertebral landmarks ***(Penman, 2009).***

The celiac plexus is made up of ganglia linked to each other on either side of the abdominal aorta. They include the celiac ganglia, the superior mesenteric ganglia and the aortic renal ganglia ***(Fig.1) (Narouze and Gruber; 2011).***

These ganglia vary in number, size and topography depending on the individual. There may be 1 to 5 pairs, with size ranging from 0.5 to 4.5 cm and extending from T12 to the

middle of L2 (less frequently L1). The origin (ostium) of the celiac trunk remains the most reliable anatomical landmark ***(Mauck and Rho; 2010***).

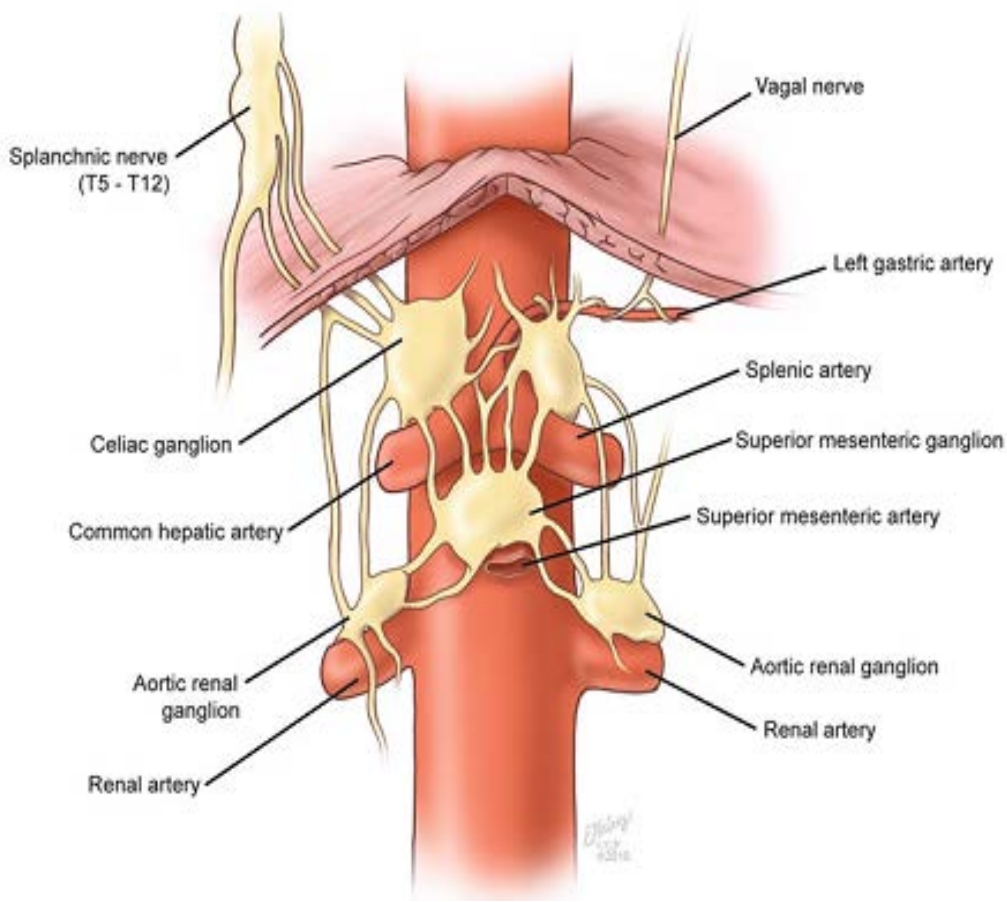

Figure 1: Celiac plexus anatomy (AP view) (Narouze and Gruber; 2011).

On the right, the ganglia are generally located 6mm below the ostium, and on the left 9mm below this landmark. However, it should be remembered that individual variations exist on the right; the ganglia can be located between 5mm above and 15 mm below the origin of the celiac trunk; on the left, between this landmark and 30mm below. These variations