POST –DURAL PUNCTURE HEADACHE: NEW TRENDS IN PREVENTION AND TREATMENT

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صداع ما بعد ثقب الأم الجافية – أساليب حديثة فى الوقاية والعلاج

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LIST OF ABBREVIATIONS

A-1 : Adenosine receptor-1
ACTH : AdrenoCorticoTrophic Hormone.
AED : Anti Epileptic Drugs.
C. : Cervical
CGMP : Cyclic Guanosine Mono Phosphate.
CGRP : Calcitonin gene related protein.
cm. : Centimeter.
CNS : Central nervous system.
CSF : Cerebrospinal fluid.
CT : Computerized tomography.
D-1 : Dopamine receptor-1.
EBP : Epidural blood patch.
FDA : Food and Drug Administration.
FM : Fibromyalgia.
GABA : γ-amino butyric acid.
H. : Hour.
HIV : Human Immune Deficiency Virus.
I.V. : Intra Venous.
I.M. : Intra muscular.
L. : Lumbar.
LD50 : Lethal dose in 50%
Min. : Minute.
ML. : Millimeter.

ML/Min. : Millimeter per minute.
MRI : Magnetic resonance imaging.
NMDA : N-methyl D-aspertate receptor.
NRM : Nucleus raphe magnus.
ORTHO : Orthopedic surgery.
PAG : Periaqueductal gray.
PDPH : Post-dural puncture headache.
PG E2 : Prostaglandin E-2
S. : Sacral.
S1 : Serotonin receptor -1
Sec. : Second.
Seg. : Segment.
T. : Thoracic.
V.C. : Vertebral column.
VIP : Vasoactive Intestinal Peptide.
Vol. : Volume.
VR-1 : Vanilloid receptor-1.
WDR. : Wide dynamic range.
Yr. : Year.

INTRODUCTION

Dural puncture is a commonly performed invasive procedure for various indications like diagnostic lumber puncture, spinal anaesthesia, myelography and intrathecal chemotherapy. However, in anaethetic practice a part of intentional dural puncture as in spinal anaesthesia, unintentional dural puncture can also occur while performing epidural anaethesia or analgesia for various indications, including post operative and labour pain relief(**Landman et al., 2005**).

A typical Post Dural Puncture Headache (**PDPH**) is described as being throbbing and frontal or occipital. Vertex, temporal and nuchal headache is less commonly reported. The headache is almost always exacerbated in the upright position and relieved by the horizontal position, its onset is after a lumber puncture, and most occur within the first 3 days following the procedure. It is not a benign complication with reports of subdural hematoma and seizures following dural puncture (**Zeidan et al., 2006**).

The first dural puncture was performed in 1891 by Quincke. August Bier reported the first case of **PDPH** in 1898. He actually suffered from this and proposed that the headache was caused by leakage of Cerebrospinal Fluid (**CSF**) through the dural puncture site **(British journal of anaesthesia, 2008)**.

Careful review of literatures suggest that **PDPH** has many other reason besides dual puncture, but there is a definite relationship between a dural puncture and **PDPH**, a fact which cannot be ignored.

AIM OF THE WORK

Highlights on New trends in prevention and treatment of Causes of postdural puncture headache .

ANATOMY

- ***Anatomy Of Vertebral Column (V.C.):***

Seven Cervical, 12 thoracic, 5 lumbar, 5 fused sacral vertebrae and the coccyx compose the vertebral column. The vertebral column has four characteristic curvatures: the cervical lordosis, thoracic kyphosis, lumbar lordosis and the anterior convexity of the sacrum. In the supine position, the lumbar spine has its highest point at L4 and the thoracic spine has its lowest point at T4 (***Ranger et al., 2008)***.

In the lumbar area, the spinous processes project directly posteriorly whereas in the thoracic area, the spinous processes project directly posteriorly and more inferiorly until they reach their steepest downward angulation at the midthoracic level where they overlap with the lamina of the vertebra immediately inferior. This overlap can make the midline approach to the epidural space difficult or impossible at the T5-T9 levels (***Hogan, 2002***).

At higher thoracic levels, the spinous processes become nearly horizontal at C7. The spinal canal is enclosed by the vertebral bodies anteriorly, the pedicles laterally, ligamentum flavum and the laminae posteriorly. The canal ends superiorly in the foramen magnum and inferiorly in the sacral hiatus (***Bridenbaugh, 1993***).

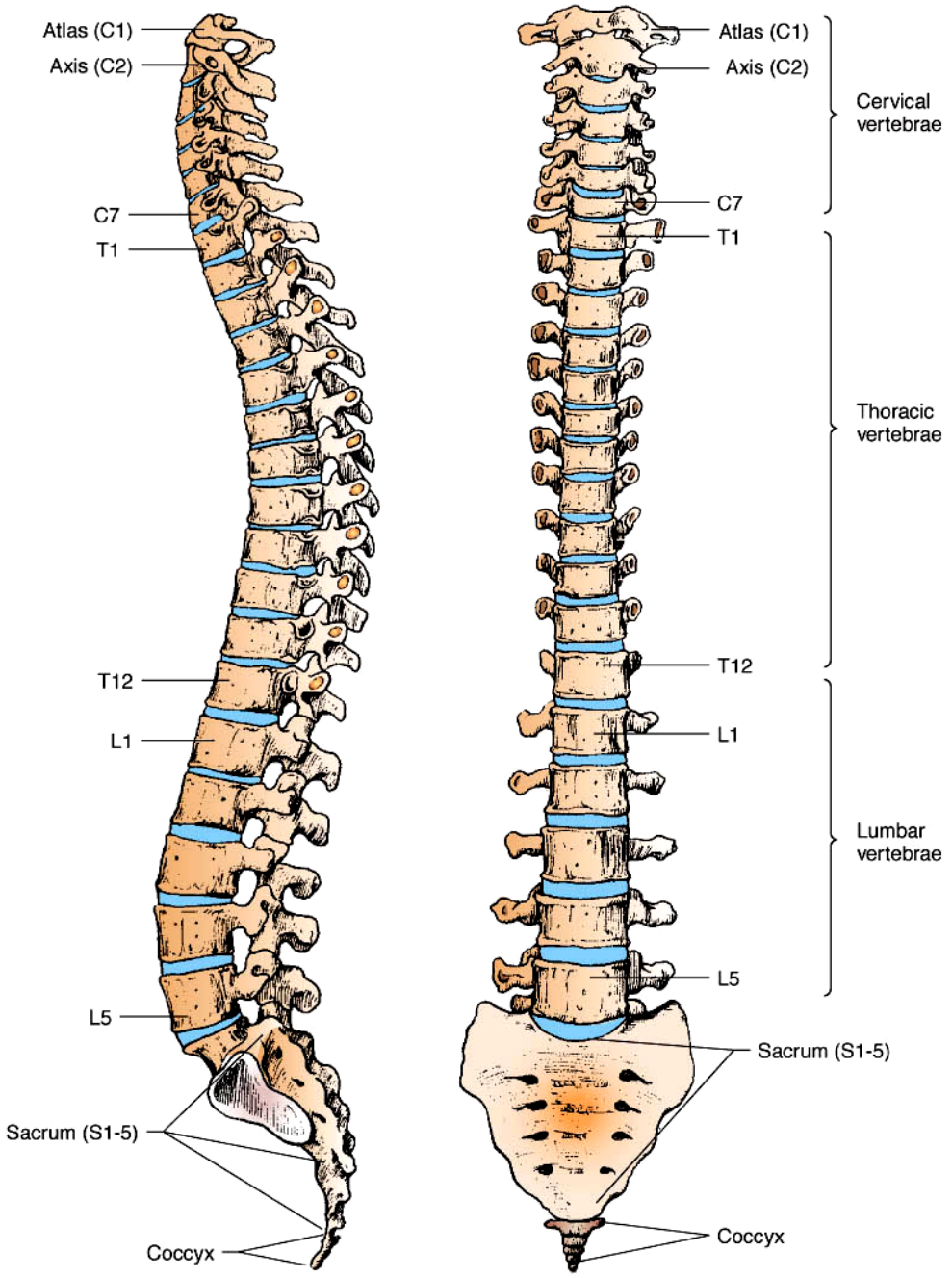

Figure (1): Regions of the spinal column. ***(Anesthesiology textbook, 2008)***

Anatomy of the vertebra:

Typical vertebra has an anterior body and a posterior neural arch which forms the boundaries of the vertebral canal.

As the column descends, the bodies increase in size to accommodate the proportional increase in body weight.

The vertebrae are separated from each other by the intervertebral discs.

The neural arch of the vertebra is connected anteriorly to the body via 2 stout bars of bones called pedicles. These pedicles tend to be attached towards the superior poles of the bodies resulting in 2 notches of uneven depth. When two vertebrae articulate with each other, an intervertebral foramen is formed through which passes the roots of the spinal nerves and the vascular structures supplying the spinal cord.

The neural arch has a single midline spinous process which projects posteriorly, and paired transverse processes which passes laterally. These processes are connected by laminae (***Bridenbaugh, 1998***).

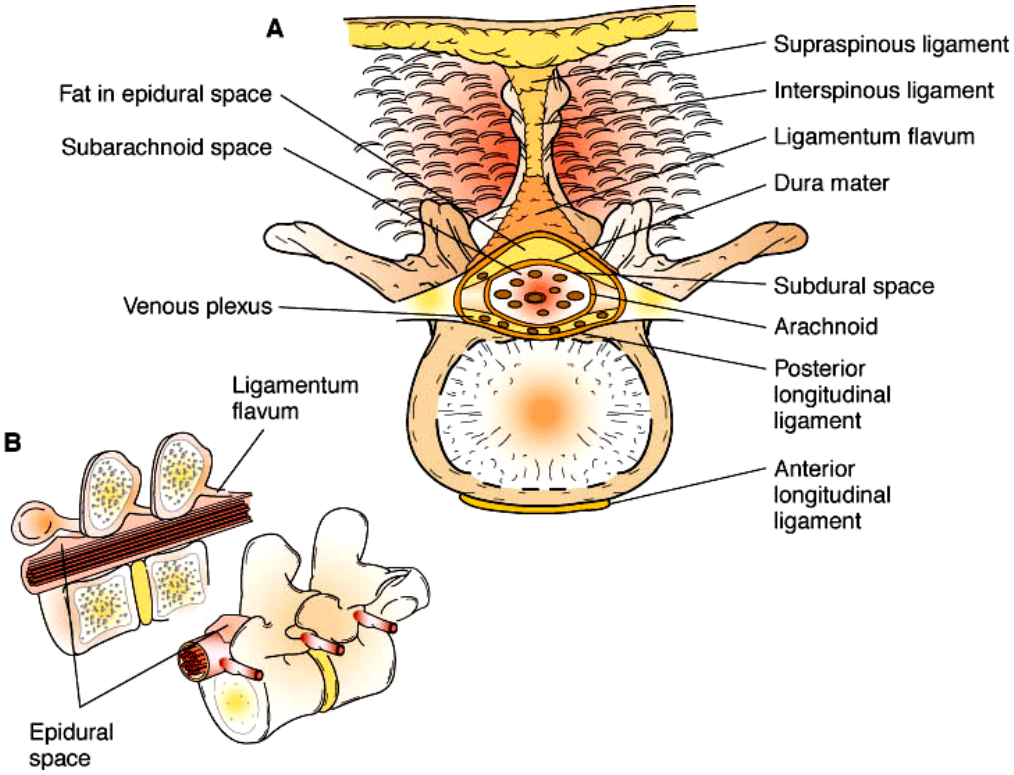

Figure (2): **(A)** Cross-sectional view of the lumbar region depicting the location of the epidural space and other anatomical structures associated with neuraxial procedures. As demonstrated in (**B**), the epidural space is somewhat compartmentalized, but continuous via "potential space" pathways that expand with injection of liquid. ***(Anesthesiology textbook, 2008)***

- ***Ligaments:***

The supraspinous ligament runs along the tips of the spinous processes and blends with the ligamentum nuchae at its superior end. In elderly individuals, the ligament can become ossified, making a midline approach of the regional anaesthesia difficult. The interspinous ligament stretches vertically from the inferior border of each spinous process to the superior border of the spinous process below, except in the cervical spine, where it is