Neurological Complications of Neuraxial block in Obstetric Anesthesia

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بسم الله الرحمن الرحيم

﴿ قَالُوا سُبْحَانَكَ لا عِلْمَ لَنَا إِلا مَا

عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴾

صدق الله العظيم

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Mohamed ELsayed Elbeshkar

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Abbreviations	*Meaning*
2-CP	*2-Chloroprocaine.*
5HT	*5-Hydroxytryptamine.*
ACLS	*Advanced Cardic Life Support.*
ACTH	*Adreno Cortico Trophic Hormones.*
BLS	*Basic Life Support.*
CNB	*Central Neuraxial Blockade.*
CS	*Caesarean section.*
CSF	*Cerebral Spinal Fluid.*
CT	*Computed Tomography.*
EBP	*Epidural Blood Patch.*
EMG	*Electromyography.*
EPT	*Electro physiologic Testing.*
I.V route	*Intra Venous route.*
INR	*International Normalized Ratio.*
KCL	*Potassium Chloride.*
LMWH	*Low Molecular Weight Heparin.*
MEP	*Motor Evoked Potential.*
MRI	*Magnetic Resonance Image.*
PDPH	*Post Dural Puncture Headache.*
SSEP	*Somatio Sensory evoked Potential.*
TNS	*Transient Neurological Symptoms.*
TPN	*Total Parenteral Nutrient.*
Vmax	*Maximum up stroke velocity.*

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Abstract

Regional anesthesia is a safe and widely utilized method of analgesia for labour. Any Anesthetic Technique , either regional or general, has potential for complications. Moreover, it has been seen that in obstetric patients, the complications are potentiated due to pregnancy-related changes in physiology and due to various other factors. Increasing trend of caesarean section in the setting of increasing maternal age, obesity and other concomitant diseases will continue to challenge the obstetric anesthetist in his/her task of providing safe regional and general anesthesia. This review has highlighted the possible complications of regional and general anesthesia encountered during the obstetric anesthesia practice. In the Western world, the majority of caesarean sections are managed using spinal (intrathecal), epidural or combined spinal / epidural (CSE) techniques. Although serious complications are uncommon with regional anesthesia, they must be considered and should be discussed with the patient.. (Cope RW. The Wooley and Roe Case. Anesthesia. 1995;50:162–73.)

Introduction

Introduction

Over 100 years ago August Bier performed the first recorded spinal anesthetic; and complications from the use of regional anesthesia have been described over this same period of time. Bier also being the first to describe a 'spinal' or 'post dural -puncture headache'.*(**Fink B R. History of Neural Blockade. In: Cousins MJ, Bridenbaugh PO (Eds): Neural Blockade, JB Lippincott, Philadelphia 1988.)* . . However, over the last thirty years the Confidential Enquiry into Maternal Deaths has been responsible for the increased use of regional anesthesia for caesarean section due to its increased safety .This has been accompanied by a very significant decrease in the death rate attributable to anesthesia. General anesthesia is now used in less than 5% of caesarean sections However, there are still a number of important complications that are associated with regional anesthesia and analgesia.

Obstetric anesthesia is generally considered to be one of the higher-risk areas of anesthetic practice. Changes in maternal physiology during pregnancy and the care of both mother and foetus present unique challenges to the obstetric anesthetists. Although new systems and technologies are developing to provide consistent and safe anesthetic care to pregnant mothers, the modern-day obstetric anesthetist has to also grapple with issues related to changing population

characteristics, including maternal obesity, advanced maternal age and an increased complexity of medical diseases ,which may affect women with a reproductive potential.

Both regional and general anesthesia carry with them the potential for complications, some of which, although rare, may be serious, life-threatening or permanently disabling.

The increasing use of neuraxial anesthesia in obstetrics has unquestionably led to decreases in maternal morbidity and mortality associated with general anesthesia. However, this has been accompanied by subsequent increase in the number of complications of regional anesthesia. While some of these complications may be mild and self limited, others may lead to permanent neurologic injury or even death.

In this presentation, the risk factors and underlying patho physiology of the neurologic complications of regional anesthesia will be described, with the dual goals of permitting the quantitation of the risk of neurologic injury in patients receiving neuraxial anesthesia, as well as describing techniques designed to decrease the risk of those complications.

Finally, a review of diagnostic studies for evaluating neurologic deficits will enable the anesthesiologist to choose a tool that can identify lesions requiring urgent intervention, those in which intervention is not indicated, and to utilize these tools to determine the prognosis of a neurologic deficit.

Anatomy

Anatomy of the Spine and Spinal cord.

Proficiency in spinal and epidural anesthesia requires a thorough understanding of the anatomy of the spine and spinal cord. The anesthesiologist must be familiar with the surface anatomy of the spine but must also develop a mental picture of the three-dimensional anatomy of deeper structures. In addition, one must appreciate the relationship between the cutaneous dermatomes, the spinal nerves, the vertebrae, and the spinal segment from which each spinal nerve arises ***(Barash etal., 2006).***

- ***The vertebral column***

The vertebral column is composed of 33 vertebrae, 7 cervical, 12 thoracic, 5 lumbar, 5 sacral (fused to form the sacrum), and 4 coccygeal (the lower 3 are commonly fused). Because it is segmented and made up of vertebrae, joints, and pads of fibrocartilage called intervertebral discs, it is a flexible structure. The intervertebral discs form about one-fourth the length of the column ***(snell, 2010).***

lumbar vertebrae consist of a body anteriorly, two pedicles that project posteriorly from the body, and two laminae that connect the pedicles These structures form the vertebral canal, which contains the spinal cord, spinal nerves, and epidural space. The laminae give rise to the transverse processes that project laterally and the spinous process that projects posteriorly. These bony

projections serve as sites for muscle and ligament attachments. The pedicles contain a superior and inferior vertebral notch through which the spinal nerves exit the vertebral canal. The superior and inferior articular processes arise at the junction of the lamina and pedicles and form joints with the adjoining vertebrae ***(Barashetal. 2006).***

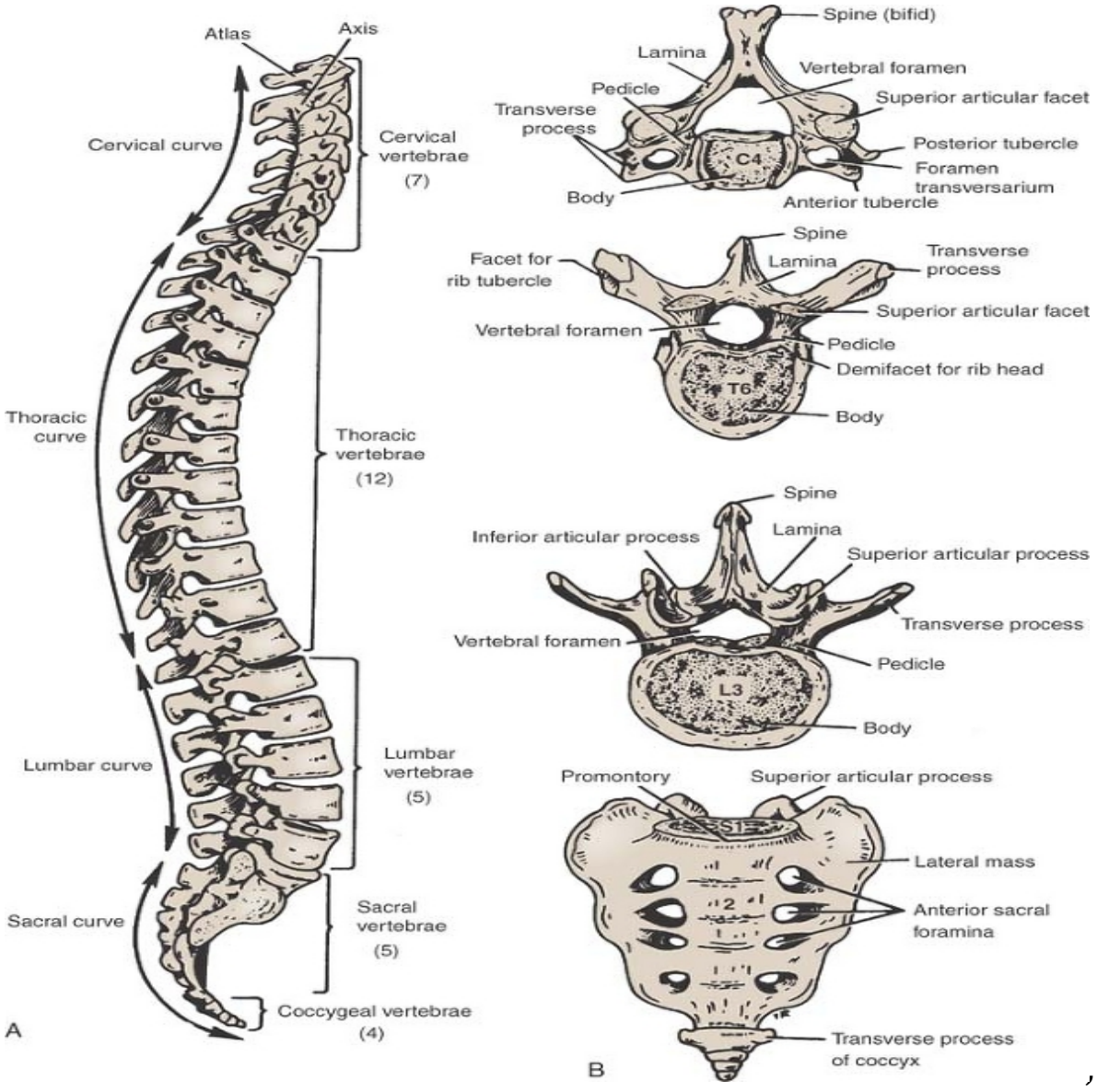

Fig. (1): Lateral view of the vertebral column. B: General features of different kinds of vertebrae. ***(snell, 2010).***

- ***Intervertebral Ligaments***

The anterior and posterior longitudinal ligaments run as continuous bands down the anterior and posterior surfaces of the vertebral column from the skull to the sacrum.

The anterior ligament : is wide and is strongly attached to the front and sides of the vertebral bodies and to the intervertebral discs.

The posterior ligament :is weak and narrow and is attached to the posterior borders of the discs.

Supraspinous ligament :This runs between the tips of adjacent spines.

Interspinous ligament : This connects adjacent spines.

Intertransverse ligaments: These run between adjacent transverse processes.

Ligamentum flavum :This connects the laminae of adjacent vertebrae.

*ligamentum nuchae :In the cervical region, the supraspinous and interspinous ligaments are greatly thickened to form the strong ligamentum nuchae.**(snell, 2010)***

- ***Inter vertebral discs***

Intervertebral discs – connect the vertebral bodies and make up 25% of the height of the spinal column. These consist of an outer annulus fibrous and an inner annulus pulposus. The superior and inferior surfaces of the vertebral bodies are also lined