

Basis Of Obstetric Analgesia And Anaesthesia During Childbirth

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Abstract

Childbirth is mixture of joy and pain, fear and expectation. It is controlled by social, religious and medical interests and doctrines. The road map of steps toward safe and happy reproductive events of mother and child was full of trials. This end point costs the human race plenty of effort of scientist and general public to improve the outcome. The success of human race is measured by how society reduces mother and child morbidity and mortality. In this article a citation of pictorial and fact related to current medical bases of obstetric anesthesia and analgesia.

INTRODUCTION

Women constituted the better half of the society of any human gathering. Still the story of pain relief during childbirth is full of retractions and obscure fears. This may be inherited beliefs from development of primitive human societies to full civilized existence. Modern women attained good education about sexuality and the possibility of pain relief during childbirth. Still not all women around "The globe" have the same level of care. This is reflected on the rate of mother and child mortalities during this supposedly the epic of pleasurable end product of reproduction. We promote healthy reproductive health in the child bearing age. The encounter of medical services and optimum anesthesia and analgesia would help complicated labor of operative obstetric and non obstetric surgery to be performed safely on both mother and child. The development of neonatal medicine, surgery and antenatal surgery still another frontier which is in support those weak babies to help them through their journey to life. Neonatal resuscitation is an important development which contributed to better stage preparation for the newborn infants.

Figure 1

Graph No. 1- Maternal access to medical services during childbearing age of women the differences between developed and developing countries which obviously reflect accordingly on maternal and neonatal morbidities and mortalities (appeared in ref. [1])

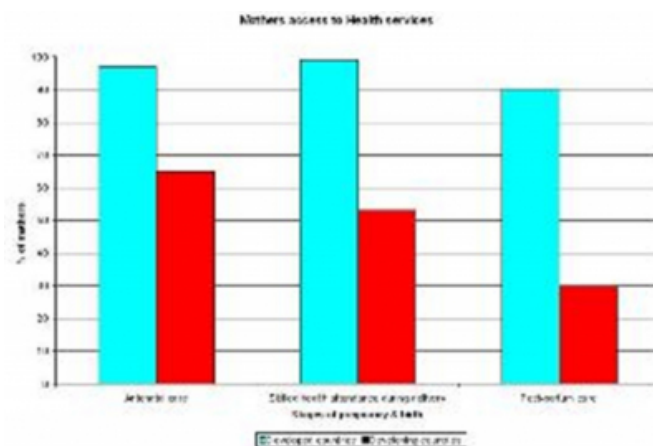
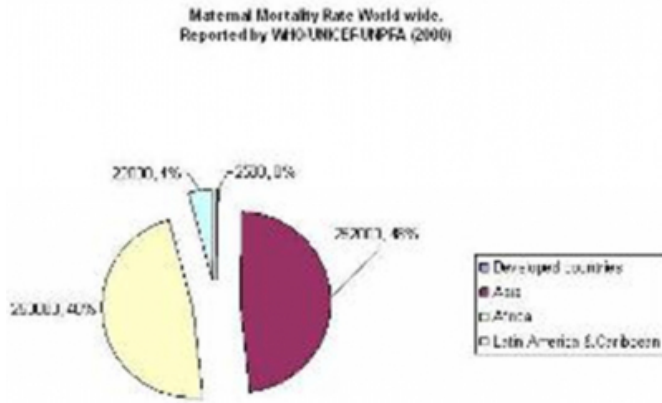


Figure 2

Graph No. 2- Maternal mortality a global view through estimate and statistics of WHO/UNICEF/UNPHA showing raised estimated maternal mortality in Africam Asia and some Latin America countries (appeared in ref. [1])



In this short review, an exhibition of millstones on the road map to current childbirth methods of concurring pain.

PAIN OF CHILDBIRTH

Pain in childbirth is considered, by some societies, a natural phenomenon and should be tolerated by women. Natural birth movement does exist in Western developed countries. It consider the birth as natural phenomenon and females should be conditioned to appreciate uterine contraction as natural process and should be preceded by relaxation classes and pelvis muscle training to cope with childbirth. Still there are advocates to birth without pain, they consider childbirth's uterine contraction as severe and need intervention. In reality there is normal [bell-shaped] distribution curve representing number of women distribution between no pain and extreme pain feeling during childbirth, and women in middle majority would feel some pain of moderate intensity and cope with it with minimal intervention. Anyway there is portion of delivering mothers population who would feel pain of contractions to a great extent and need to be helped, being rated by these women as the most painful experience of their lives.

The modern tendency of medical authorities is to advise and to educate women about the options for, and availability of effective analgesia in labor. However, the final option is for the delivering women and her need for pain relief. It is worth noting that many women prefer birth experience without risk to baby and tolerate some degree of birth pain.

Women delivered during all the ages without concern. Many records in literature and history about the mystical childbirth

of famous women: The childbirth of Cleopatra when she was delivering her son Caeseron as normal ceremonial delivery. Also Rozabah aided by alcohol and Phenix wing open her abdomen for delivery of her son Rustom originally described in Alferdawsji book (Shahnamah) [3].

Figure 3

Photo No. 1- Cleopatra's Childbirth. Replica of Ancient Egyptian event the birth of Cleopatra son around 46 BC reflect the ceremonial nature of that sacred birth (appeared in ref. No [1]), called Caesaron or "Little Caecer".



Even children were extracted from the womb of their dying mothers as mentioned in ancient medieval stories and literatures.

Figure 4

Photo No. 2- The mother is laying on her back while Hakims extracting the child from the womb Al Bairuni. This image may be the first illustration of a caesarean section. Called "Al Bairuni" appears in or the Chronological of Ancient Nations (Edinburgh University Library) which was written by the famous Muslim chronicler, Al Beruni, (973-1051).



Rouzabah in Persia had delivered under the effect of alcohol and the Phenix touch her abdomen to split it allowing her to deliver her son Rustom. Some historians consider this event as the first mention of mystical Caesarian section under the effect of wine [3].

Some cultures used opium and mandrake. Mainly were

oriental cultures; Indian, Persian and some Arabic communities.

Medieval wood craft shows delivery wing in the house attended by fortune and star reading and mother allowed sips of alcohol. {Anesthesia's Wood Library collection}.

Some in Scotland were persecuted due to use analgesia in labor as been accused with witchcraft. In some Muslim communities “Seal” with name of Allah and words of Quran were stuck on the thigh of delivering mothers to ease the childbirth pains.

In Scotland There were strange happening regarding pain relief during childbirth; when Eufam McCalyean and Agnes Sampson were burnt to death on the account of witchcraft because the first woman asked the help of the second to give her something to relief pain. Latter on some anaesthesia history researchers consider it a political plot [3].

Figure 5

Photo No. 3- Wood-craft showing delivery room with fortune teller and stars readers and mother sitting on delivery chair (Anesthesia Wood Library collection)



Figure 6

Photo No. 4- Seal in hand writing with prayers to ease the pain used in Arabic Middle East (appeared in ref. No. [2]) Al Antaki [1008 hijra] Altazkirah popular library Beirut Lebanon 197(Schnider et al 1979



MODERN ANESTHESIA AND LABOR

The modern development of anesthesia and analgesia influenced by discovery of ether effect on consciousness and use this property in surgery. Soon Ether was administered to delivering mothers; Chloroform was another popular Inhalational anesthesia agents to get into obstetric practice

On the hands of James Young Simpson (1811-1870), Again some antagonism appeared on medical and theological bases till queen Victoria used chloroform during her birth of prince Leopold (1853) [3 - 6].

Figure 7

Photo No. 5- First public demonstration of anesthesia
Morton gave ether 1846 T. G. Morton give Etheron “Ether”
to a patient to be operated upon by John Warren the surgeon
at Machusetts General Hospital Boston in 1846. [3]



Figure 8

Photo No. 6- James Young Simpson (1811-1870).
introduced the use of chlofororm into obstetrics 1847 in
Edinburgh, Scotland [3, 4].



Figure 9

Photo No. 7- John Snow (1813 - 1858) gave chloroform to
Queen Victoria during her birth of prince Leopold (1853) [3,
4].



Figure 10

Photo No 8- Queen Victoria Who ended the debate about analgesia in childbirth by using chloroform inhalation during her birth of prince Leopold (1853) [3 - 6].



Figure 11

Photo No. 9- Fahy Longfellow used inhalation in labour [7] . Shortly after James Young Simpson (1811-1870). Introduced the use of chloroform into obstetrics 1847 in Edinburgh Scotland,



Analgesia and anesthesia in obstetrics preconditions [11 – 18]:

Two beings are in one body

No harm to mother

No depression or loss of ventilation

No loss of the ventilatory airway patency

Maternal cardiovascular collapse avoidance

No harm to the child by observing the following:

Placental transfer of depressant drugs

Uterine perfusion effects of drugs

Oxygenation maintenance

No or limited degree of neonatal depression

These preconditions govern all medications and techniques adopted in analgesia and anesthesia during well defined needs of anesthesia during the following situations:

Anesthesia during pregnancy for surgery.

Pain relief during pain of childbirth.

Caesarian section elective or emergency.

Forceps assisted delivery.

Removal of retained placenta.

OBSTETRIC ANALGESIA

In antenatal clinic visits, obstetric team should discuss with the women and counsel them regarding their preferences of methods available and attainable to help painful episodes during labour, pharmacological or non pharmacological methods and those of possible risk of getting caesarean delivery of choice of anaesthesia method. The wishes of the woman according to informed consent and advice will serve the objective of preserving the well-being of mother and her coming baby. [16-19]

In the sixties and seventies of the last Century studies showed that women who get severe pain during uterine contractions in childbirth in the right side of bell-shaped curve can have adverse physiological effects [8-14].

1- Uterine contractions in the first stage of labour are associated with visceral pain that can affect and prolong gastric highly acidic contents emptying

2- hyperventilation leads to respiratory alkalosis and metabolic acidosis.

3- Increased cardiac output and blood pressure

4- discoordinate uterine contractions and reduced placental perfusion

5- Foetal acidosis endangering wellbeing of the infant.

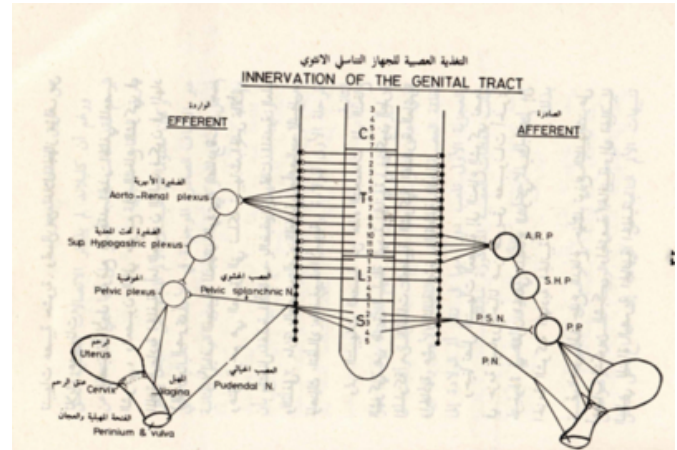
These effects on the mother and infant would be prevented by effective analgesia [16- 20].

Pain experienced during delivery involves somatic neural

pathways and is thus different in character to the visceral pain associated with uterine contractions.

Figure 12

Graph No. 3-Pain and motor pathway of childbirth contraction pain according to cumulative findings of amny researchers (appeared in ref. No [2])



NON-PHARMACOLOGICAL METHODS

There are several non-drug options available to women in labour, such as prepared childbirth training, psychoprophylaxis , Natural childbirth, Trans-cutaneous electrical nerve stimulation (TENS) therapy and physical therapy. There is a lack of clear evidence supporting their efficacy but they may have benefits in individual situations and may reduce the need for pharmacological pain relief. In a systematic review, TENS was ineffective. Women should be given a realistic assessment of the severity of labour pain and the relative efficacy of non-pharmacological methods; for example, prepared childbirth training reduces labour pain by only about 10 per cent [15, 16, 19].

Figure 13

Fig. No. 10- Non-pharmacological method of pain relief TCNS. It show the electrodes positions on the back of the subject which conduct light electrical stimulation current which hopfully help to reduce labour pain. (appeared in ref. No [2]).

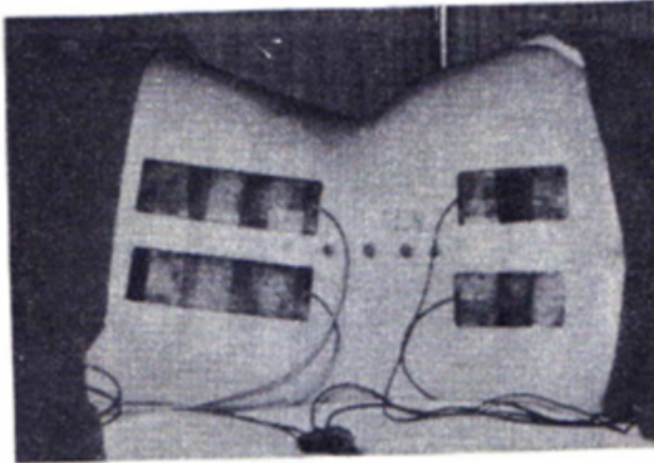


Figure 14

Fig. No 11- Non-pharmacological method of pain relief by Hein's method which was cumbersome and made delivering mother difficult to nurse. It was an apparatus produces negative pressure around the abdomen to make the uterus spherical during contraction so it could reduce the pain of labor. (appeared in ref. No [2]) Heyns O.S. (1959) Original reference [28]



سيدة تستعمل جهاز هينس

PHARMACOLOGICAL METHODS

The pharmacological analgesia is popular among delivering women, since there is a variety of analgesic drugs and methods of administration.

These methods include:

Inhalation of nitrous oxide and oxygen; Entonox .

Pethidine and other opioid

Epidural administration of opioid and local anaesthetic.

INHALATIONAL ANALGESIA

Entonox is 50:50 mixtures of nitrous oxide and oxygen, premixed and compressed into a cylinder for home use under supervision of midwife. Also it may be used in labour ward

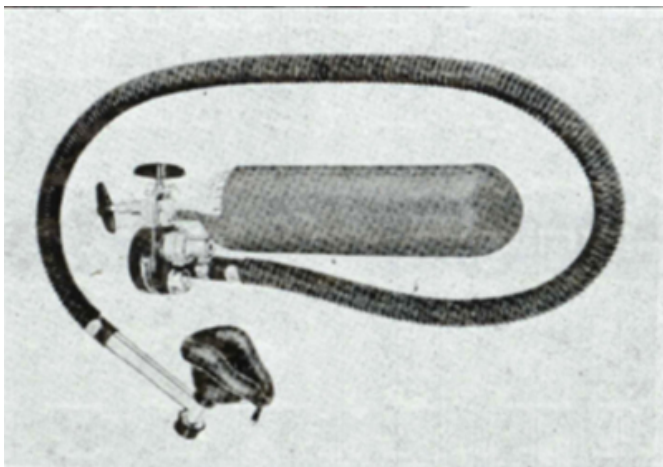
as premixed compressed mixture of by hospital pipe lines with flow meters. It was introduced commercially in 1965.

It is a potent analgesic comparable to that of morphine. It gives brief pain relief, sedation and reduced anxiety during a wide range of painful procedures such

as chest drain removal, pin site dressings, physiotherapy;. Nitrous oxide is an anesthetic gas so it may lead to unconsciousness. So Entonox should only be self-administered when used for pain relief. When administered, via face mask or mouthpiece, by delivering women she will take good deep breaths in, as she feels the approaches of uterine contraction. If she loses consciousness she will be discontinued inhaling the mixture because the mask will fall away from her mouth and nose Entonox acts quickly and its analgesia permits to be timed with contractions, However, its analgesic effect is limited, with at least one study of its use in early labour showing no real reduction in pain scores during contractions [23]

Figure 15

Fig. No. 12 – Cylinder and non re-breathing mask of intonox apparatus to deliver 50:50 oxygen: Nitrous oxide premixed mixture for midwife use (appeared in reference [2])



A recent systematic review looked to the efficacy and safety of nitrous oxide for labor analgesia. Eleven randomized controlled trials with adequate control groups and outcome assessment by parturients during or shortly after the intervention were used to determine efficacy. To determine adverse outcome, descriptions found in 8 controlled trials and in 8 observational studies were included. A now systematic review of studies on occupational exposure was also conducted. Nitrous oxide is not a potent labor analgesic, but it is safe for parturient women, their newborns, and health care workers in attendance during its administration.

It appears to provide adequately effective analgesia for many women [24]

Recently [25] sevoflurane was used in small fraction 0.8% and looked helpful in that context (analgesia in hospital). Many inhalational agents in the past were used like trichloroethylene (trilene), methoxyflurane, enflurane halothane either for analgesia provision or as supplements to Nitrous oxide anaesthesia. All are of no place in obstetric practice today . Sevoflurane is welcomed in obstetric anesthesia for its pharmacodynamics properties and capability to induce inhalational anesthesia in one maximum inspiration volume for patient without intravenous access of airway problems. it was advocated for obstetric analgesia recently it was demonstrated to have acceptable analgesic properties in sub-anesthetics concentration. Recently studies determined the optimal inspired sevoflurane concentration for use during labour as 0.8% . The research group went to compare sevoflurane at a concentration of 0.8% and Entonox (nitrous oxide 50%: oxygen 50%) for analgesia during labour in 32 healthy parturients. Each mother underwent two open-label, three-part sequences in random order, Entonox-sevoflurane-Entonox or sevoflurane-Entonox-sevoflurane. In each part the agent was self-administered during contractions. A 100 mm visual analogue scores for pain relief and sedation was completed immediately after each contraction. The result was as follow: Two patients withdrew during administration of sevoflurane (because of its dour) and five during Entonox (requesting epidural analgesia). Of the remaining women, data were available for analysis from 29 participants pain relief scores were significantly higher for sevoflurane than for Entonox. Nausea and vomiting were more common in the Entonox group. No other adverse effects were observed in the mothers or babies. There was significantly more sedation with sevoflurane than with Entonox. Twenty-nine patients preferred sevoflurane to Entonox and found its sedative effects helpful. The authors concluded that self-administered sevoflurane at subanaesthetic concentration (0.8%) can provide useful pain relief during the first stage of labor, and to a greater extent than Entonox. Although greater sedative effects were experienced with sevoflurane, it was preferred to Entonox [25].

REGIONAL BLOCK BY USING EPIDURAL, SPINAL OR COMBINED TECHNIQUES.

Lumbar epidural regional block 'Fig 13, 14] in childbirth analgesia and Caesarean delivery is a highly effective method to get task of birth management done. It has

acceptance among delivering women. Epidural practitioners use nowadays low doses of one opioid and local anaesthetic available to practitioner [Fig. 15]. These drugs are injected intermittently through an epidural catheter in order to give the dose according to situation needs. The block for pain relief during birth in this way can preserve legs muscles power. The dose may be given this way to cover instrumental vaginal delivery or Caesarian section delivery analgesia requirements of the mother

Is there risk from epidural and does it really increase instrumental deliveries?

This is a very complex question. Many factors influence the possible outcomes, more related to the selection of delivering women who had protracted delivery. It is important to give full picture and education to mothers so they would be fully informed and give informed consent for using these methods.

□ modified technique using combined spinal and epidural to reduce dosages in order so mother may be able to walk “Walking epidurals”.

Figure 16

Fig. No. 13 – Picture showing the insertion of an epidural catheter by anaesthesiologist for delivering mother, under steriale condition and onbedside in the presence and help of certified midwife, in hospital setting (Portex copamy picture - apeared in refernce [2])



Figure 17

Fig. No. 14 – Transverse section view of lumbat spinal vertebra showing the anatomical part refered to in the text especially spinal and epidural area where local anesthetics are injected.

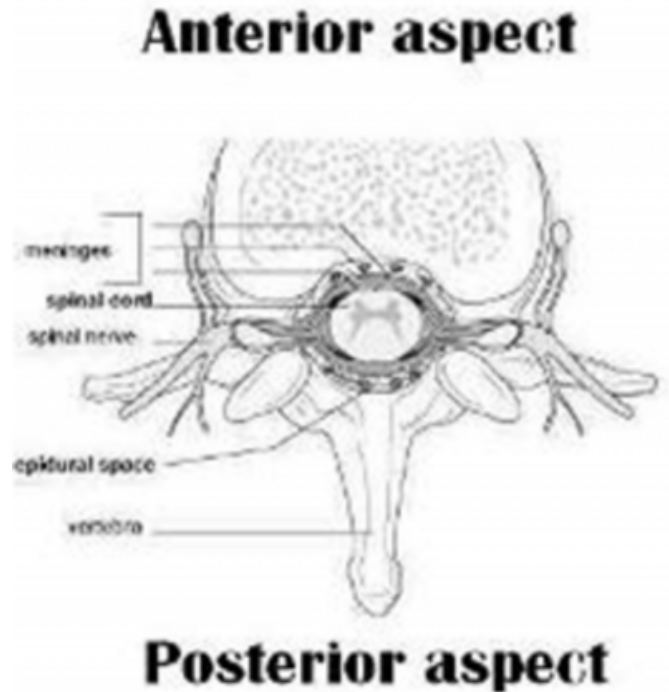
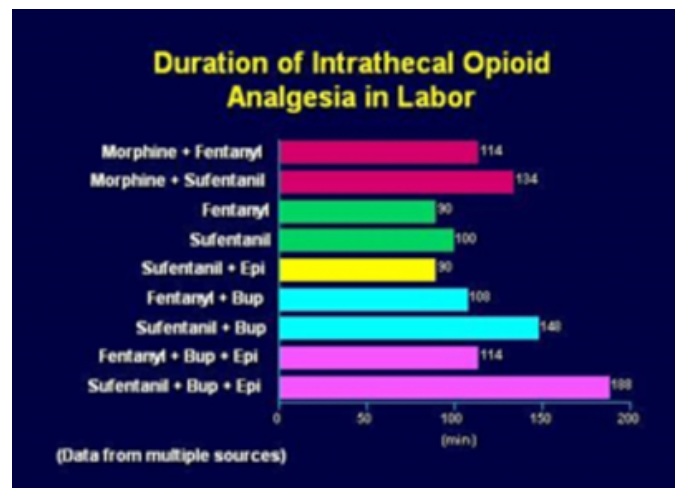


Figure 18

Fig. No. 15 – Duration of intrathecal opioids analgesia in Lbor. Sufentanil + pubivacaine + epidural would provide longest pain relief duration after (Cohen S. 2008)



GENERAL ANESTHESIA

General anesthesia during surgical delivery was associated with special risk factor of acid aspiration of gastric contents due to emergency nature of surgery. Better understanding of this hazard changed the face of practice and tipped the

balance toward fasting guidelines, precautions to prevent this hazard and using regional blocks in order to prevent the aspiration risk. Also it depend on anesthesia techniques which prevent depression of vital functions of the delivered baby by using drugs which does not accumulate in the body of the newborn child, The neonatal department with special incubators and skills in nonatal recuscitations are usually plastroCvided during each surgical delivery in hospitals.

Last wards of the article are a call for more effort to help women during their productive lifes. Nfortunately inspite of all progress of human race still great numbers of women do not have optimum care, Although 160 years has elapsed since the days of Sympton [27] still many women deliver their children in pain.

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