

PAINLESS LABOUR

ESSAY

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INTRODUCTION

PAINLESS LABOUR

Introduction

Pain relief in labour is now accepted as the right of all mothers, while we keep in mind three essentials, preservation of foetal homeostasis, foetal and maternal safety and simplicity (Pritchard and Macdonald, 1983).

Thirty years ago, the anaesthetist attended the obstetric department for emergency only. Things are different today, in many centers, a regular obstetric pain relief service has been established. The anaesthetic department may be responsible for about 80% of pain relief in labour. The role of anaesthetist in obstetrics is now increasing and must be carefully assessed, organised and accepted with responsibility.

The ideal procedure of pain relief in labour should fulfil the following:

- Should produce effective analgesia without loss of consciousness and allow good co-operation from the mother.
- Should not depress the respiratory center of foetus or mother.
- Should not depress the uterus; causing prolonged labour.

- Should be non toxic.

- Should be safe for mother and foetus (Lorder, 1982).

Safe and pain free childbirth is a dream of the future rather than a reality of today because no agent or technique in use at present fulfils all the previous properties (Reading and Cox, 1985).

- Analgesia by drugs is not necessary in every case of labour. Parturient may be only in need of proper preparation, emotional support, psychologic support and sympathetic explanation. These things are now described as non invasive method for pain relief in labour and is called psychoprophylaxis (Atkinson and Lee, 1977).

The subject of pain relief during labour is fully discussed in many textbooks, reviews and references, in this essay, we are going to cover the recent advances, modern policies and current concepts in obstetrical analgesia.

PHYSIOLOGY OF LABOUR PAIN

If a muscle contracts rhythmically in the presence of adequate blood supply, pain does not usually result. This fact is not fully accepted in case of uterine muscles contractions. In many languages, the common designation for such contractions is "labour pain".

Uterine muscles contain contractile elements (protein). These elements (in the presence of energy and certain level of intra-cellular free Ca^{+}) slide, giving rise to uterine contraction when the free Ca^{+} is released from its repository form in the sarcoplasmic reticulum. Translocation of calcium back to the stored form is associated with uterine relaxation (Reading and Cox, 1985).

It is not clear, how such contractions give a sensation of pain, but we can consider this pain as one of the followings:

(1) Muscle pain

This pain is considered if we think of hypoxia of the contractile myometrium and accumulation of local metabolites, as the stimuli. Such factors act as a chemical stimulus in initiating pain sensation. If blood flow becomes adequate to wash these metabolites from the muscles, pain is diminished or even disappears.

This is reported during uterine relaxation. (Abboud et al., 1983c).

(2) Visceral pain

This pain is initiated by stretching the receptors that are present both in the cervix and peritoneal covering of the uterus and cervix. (mechanical stimulus).

(3) Compression of nerve ganglia

This compression occurs during uterine contractions, and affects the nerve ganglia in the cervix and lower uterine segment. This is proved because paracervical infiltration by local anaesthetic produces appreciable relief of pain (Pritchard and Macdonald, 1983).

Labour pain could be considered as a reflex, so it needs stimulus, peripheral pathway, high center and response.

(A) Stimulus of labour pain

As uterine contraction starts, the cervical and uterine tissues begin to be stretched and torn. In addition, the uterus exerts traction on its suspensory ligaments. The contraction of uterine muscles (sliding of myofibriles) results in release of metabolites such as kinin and lactate which accumulate in the uterus. Together with the associated ischemia of nerve endings and compression of nerve ganglia in

para-cervical tissue, these stimuli initiate the nerve impulses (White , 1982).

(B) Peripheral pain pathways:

1. Uterine and cervical pain:

The pain of the first stage of labour is mainly due to dilatation of the cervix and lower uterine segment that occur with uterine contractions. The pain impulses from the stretched receptors at these areas are transmitted via visceral afferent sensory fibers that accompany the sympathetic efferent nerves. Then they pass through para-cervical plexus (in the tissue near the base of utero-sacral ligament alongside the uterine artery). Then they pass through the pelvic, hypogastric and aortic plexuses to the lumbar and lower thoracic sympathetic chain. Then they enter the spinal cord through the posterior roots in the white rami communicates with 10th, 11th, and 12th thoracic and 1st lumbar nerves. So, labour pain is always referred to the skin dermatomes supplied by these spinal segments (Lower abdomen, lumbar spine and upper sacrum). Pain impulses in the early part of the first stage are transmitted via T₁₁, T₁₂ while the severe pain of the late first stage spreads along T₁₀, T₁₁, T₁₂ and L₁ so referred to the umbilical region, upper thighs and mid-sacral areas (Bonica, 1972).

2. Perineal pain:

During late stage of labour (expulsion stage), labour pain is provoked by descent of the presenting

part and distension and tearing of fascia in the pelvis, perineum and vulva. Pain from pelvic structures is transmitted via somatic lower lumbar and upper sacral segments while perineal pain is transmitted to spinal cord via 2nd, 3rd and 4th sacral nerves. Small areas of perineal and vulval skin are supplied by the ilio inguinal, genitofemoral branch of femoral cutaneous nerve and cutaneous branch of S₂, S₃, S₄. So pain in the second stage is accompanied by intense desire to bear down due to local pelvic reflex.

(C) Central pain pathways

After pain impulses enter spinal cord via white dorsal rami, decussate and ascend to the brain stem through spinothalamic tracts. When they reach brain stem, these impulses stimulate both the reticular formation and thalamic nuclei. Then they project to many areas of the cortex producing the conscious sensory experience of pain. These impulses also initiate and stimulate descending pathways which cause reflex effects on different body systems (Bonica, 1972).

(D) Reflex effects of labour pain

1. Cardio-vascular system: Cardiac output increases to 60%. Tachycardia, slight hypertension, and even arrhythmias may occur. Uterine blood flow is

proved to be reduced experimentally in ewes by induced pain. This may be explained by release of endogenous catecholamines.

2. Respiratory system: Hyperventilation is a common response to painful stimulation. This may affect CO_2 level in maternal blood in some patients. The resulting respiratory alkalosis may produce foetal hypoxia by decreasing uterine blood flow and shifting the maternal O_2 dissociation curve to the left.

3. Musculo-skeletal system: Maternal expulsive efforts (bearing down) may become an un-controllable urge as a result of labour pain. Lactic acidosis has been reported to result from excessive muscular efforts (Albright, 1978). This effect is modified by the use of analgesia.

Noulty and others at 1982 ,
said that in many circumstances (e.g. maternal cardiac, respiratory diseases, diabetis mellitus, hypertension and psychic disorders) both mother and foetus respond to labour pain in a jeopardizing manner. This response can be modified by the judicious use of analgesic techniques.

LABOUR PAIN
INTENSITY AND ASSESSMENT

THE INTENSITY OF LABOUR PAIN

1. In relation to uterine contraction:

The intensity of labour pain bears no relationship to the strength of uterine contraction, nor to the consequent increased intra-uterine pressure. Each uterine contraction slowly increases to a maximum which is sustained for a few seconds and then rapidly fades away. Pain starts at a variable intervals following the start of contraction and the length of these interval depend on the individual pain threshold. The relationship of pain to uterine contraction is illustrated in Figure (1). This shows that with normal threshold to pain the mother would experience 15 seconds of painless contraction, 30 seconds of painful contraction, followed by 15 seconds of painless contraction as pain intensity diminishes below the threshold. The intensity of pain suffered may be represented by the vertical distance B D-in normal pain threshold, AD-distance in high threshold and CD distance in low pain threshold. The thresholds of pain vary widely in different women. According to the figure, few of them deny suffering any pain whatever in labour, those would be represented on the diagram by having a very high pain threshold. Their horizontal line never cross the contraction curve. The uterine contraction in a women