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Efficacy of Ketoprofen Phonopheresis on Acute Perineal Pain after Episiotomy

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Abstract

Background: Almost 50 percent of primiparous women suffer from acute perineal pain after episiotomy; Ketoprofen phonophoresis is effective in decrease acute perineal pain after episiotomy.

Aim of Study: This study was conducted to determine the effect of ketoprofen phonophoresis on acute perineal pain after episiotomy.

Patients and Methods: Forty primiparous women suffering from acute perineal pain after episiotomy were participated in this study. They were selected randomly from the maternity ward at Dar – Ismaeil Hospital For Obstetrics & Gynecology in Alexandria. Their ages were ranged from (20-30) years old; their body mass index didn't exceed 30kg/m^2, and their pariety was (zero) children. They were divided randomly into two equal groups as study group (Group A) and control group (Group B). The study group (Group A) was consisted of 20 patients. Each patient in this group received ketoprofen phonophoresis around stitches of episiotomy for 10 minutes, twice daily for 7 days. Also, each patient was asked to perform pelvic floor exercises for 20 minutes, twice daily for 7 days. While, control group (Group B) was consisted of 20 patients. Each patient in this group was asked to perform pelvic floor exercises for 20 minutes, twice daily for 7 days as in group (A). All patients in both groups (A&B) were evaluated by Visual Analogue Scale (VAS) and measuring serum cortisol level in blood plasma before starting and after the end of treatment program.

Results: Both groups (A&B) showed a statistically (p<0.001) significant decrease in visual analogue scale (VAS) and serum cortisol level after the treatment course, yet this decrease in VAS and serum cortisol level in blood plasma was more pronounced and statistically significant (p<0.001) in study group (Group A) when compared to control group (Group B).

Conclusion: Ketoprofen phonophoresis is an effective method for treating acute perineal pain after episiotomy.

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Key Words: *Ketoprofen phonopheresis – Acute perineal pain – Episiotomy – Visual analogue scale – Serum cortisol level.*

Introduction

EPISIOTOMY is an operation in which perineum is incised (cut) during labor. An episiotomy is done to widen the vaginal opening when a woman is giving birth, so it makes more room for the baby to be born *[1]*.

Episiotomy allows the baby to come through vagina more easily without any tearing in the perineal skin or at the vaginal opening. Sometimes, a woman's perineum may tear as her baby comes out. In some births, an episiotomy can help to prevent severe tearing of the perineum or speed up the delivery if the baby needs to be born quickly. An episiotomy has a great advantage, since it prevents prolonged overstretching and irregular tearing of the perineum during child birth which can be harder to repair *[2]*.

An episiotomy is usually done during the second stage of labor (pushing stage) when the baby's head stretches the vaginal opening to several centimeters. At this moment, the healthcare provider will use surgical scissors or a scalpet to make a small cut in the perineum and vaginal wall. This cut is usually sutured within an hour after delivering the baby and placenta. The doctor will use stitches (sutures) to repair the perineal tissues, and muscle and these stitches will dissolve overtime *[3]*.

Episiotomy is an incision made in the perineum-the tissue between the vaginal opening and the anus-during childbirth. A midline (median) incision is done vertically. A mediolateral incision is done at an angle. A midline incision is easier to repair, but it has a higher risk of extending into the anal area. A mediolateral incision offers the best protection from an extended tear affecting the anal area, but it is often more painful and is more difficult to repair *[4]*.

For many years, an episiotomy was considered a perfectly normal and healthy procedure to perform during vaginal delivery. The healthcare professionals stated that, an episiotomy made childbirth easier because it stretches the pelvic floor less and prevents the perineum from tearing. Also, they added that, a surgical incision would heal better than a natural tear and an episiotomy would help to preserve the muscular and connective tissues that support the pelvic floor *[5]*.

In fact, an episiotomy has several advantages: It reduces risk of perineal trauma, subsequent pelvic floor dysfunction & prolapse, urinary incontinence, fecal incontinence and sexual dysfunction. It shortens the second stage of labor, prevents intracranial hemorrhage in premature babies, facilitates labor, prevents prolonged overstretching and irregular tearing of the perineum *[6]*.

It is usually followed by severe perineal pain and swelling due to inflammation, redness and hematoma in the perineal skin and perineal tissues. On long term, there may be chronic perineal pain, painful perineal scar, infection, dyspareunia, urinary incontinence, prolapse and fecal incontinence *[7]*.

Perineum is a very sensitive structure, cutting and suturing these tissues can cause severe pain and inflammation. The perineum becomes sore, tender and swollen. The area may take longer time to heal and the perineal soreness can subside after few weeks. The wound begins to heal immediately after suturing, it often takes several weeks to heal completely and for soreness to resolve. But if perineal scar is formed, it can cause pain and discomfort for a month or longer *[8]*.

Most of the women Who had vaginal delivery with episiotomy experience severe acute perineal pain due to incision and stitches. The perineal skin becomes red and swollen due to inflammation. There is hematoma in the perineal tissue and the incisional site may bleed. The mother may have fever and body ache if the wound is infected. Also, if the wound is covered with scar tissues the perineal pain gets worse. This scar formation may lead to dyspareunia. The long-term complications include chronic perineal pain, painful scar, anorectal and pelvic floor dysfunction. The short and long-term complications can severely disrupt the daily life of the mother *[9]*.

After episiotomy several issues are happen. Because the muscles in the perineum are involved in daily activities such as sitting, walking, bending, squatting, urination and excretion, the mother experiences difficulty in sitting, walking, urination and defecation due to pain and swelling in the perineum. The swollen perineum makes sitting very painful so, the mother can't feed her baby from sitting position. Also, walking becomes very difficult and painful as well as urination and defecation. This of course has a great impact on quality of life of the mother. In some cases, if pain isn't addressed the condition may be escalated and exacerbated leading to post-natal depression because post-natal depression is linked with post-partum pain *[10]*.

Kegel exercises have several benefits after episiotomy, they facilitate flexibility of the tissue, reduce inflammation & swelling in the perineal region, relieve acute perineal pain, encourage wound healing, strengthen pelvic floor muscles and prevent pelvic floor dysfunction such as uterine prolapse & stress urinary incontinence *[11]*.

Kegel exercises is a set of pelvic floor exercises that help to tone up pelvic floor muscles, strengthen them and thus prevent its dysfunctions like pelvic organ prolapse and urine incontinence. They help to improve bladder and bowel control. Kegel exercises are vital in keeping the integrity of perineal area after episiotomy *[12]*.

Strengthening the muscles around the vagina and anus by doing pelvic floor exercises can help with healing and will reduce pressure on the cut and surrounding tissues. Pelvic floor exercises involve squeezing the muscles around vagina and anus *[13]*.

The mother should start pelvic floor exercises as soon as she can after birth. Pelvic floor exercises enhance blood circulation to the perineal tissues and accelerate healing process. They also help in reducing pressure on the cut *[14]*.

The mother should keep doing pelvic floor exercises after episiotomy because kegel exercises can increase stength & endurance of pelvic floor muscles, reduce perineal haematoma, relieve acute perineal pain and accelerate wound healing *[15]*.

Kegel exercises help in increasing blood circulation to the perineum and speed up healing process of the perineal wound after episiotomy. Also, Kegel exercises help in increasing strength of the muscles that surround urethral sphincter and anal sphincter *[16]*.

Phonophoresis is a physical therapy modality that is commonly used to treat inflammatory tissues and injuries of soft tissues. Several studies suggested that phonophoresis is significantly more effective for pain relieve than medication *[17]*.

Phonophoresis is a safe and painless procedure with no side effects like medications. It is a good treatment option to reduce inflammation and relieve perineal pain after episiotomy. Several studies confirmed that, phonophoresis is a fantastic therapy tool to decrease pain & inflammation, accelerate wound healing and help patient to return to her optimal function as quickly as possible *[18]*.

Fastum Gel contains a medicine called ketoprofen. Fastum Gel belongs to a group of medicines

called Non-Steroidal Anti-Inflammatory Drugs (NSAIDs). These reduce inflammation and relieve pain. Fastum Gel is used to relieve the pain of soft tissue injuries, and acute strains and sprains [19].

The study was conducted to investigate the effect of ketoprofen phonophoresis in treating acute perineal pain after episiotomy, so that, this might answer a question about the effect of ketoprofen phonophoresis on acute perineal pain after episiotomy.

Subjects and Methods

Forty primiparous women suffering from acute perineal pain after episiotomy were participated in this study. They were selected randomly from the maternity ward at Dar – Ismaeil Hospital For Obstetrics & Gynecology in Alexandria. This study was conducted from July 2023 to March 2024. Their ages were ranged from (20-30) years old; their body mass index didn't exceed 30kg/m^2, and their pariety was (zero) children [as shown in (Table 1)].

Table (1): Demographic features (general characteristics) of the two studied groups (A&B).

Variables	Group A (n=20)	Group B (n=20)	*t*-value	*p*-value
Age (yrs.)	27.00±2.92	26.15±3.28	0.865	0.392 (NS)
Weight (kg.)	75.38±8.535	77.70±6.03	–0.995	0.326 (NS)
Height (cm)	164.65±5.84	167.55±3.65	–1.883	0.069 (NS)
BMI (kg/m^2)	27.72±1.60	27.60±1.49	0.245	0.808 (NS)

Data are expressed as mean ± SD. NS = $p>0.05$ = Not significant.

All women divided randomly into two equal groups as study group (Group A) and control group (Group B).

The study group (Group A) was consisted of 20 patients. Each patient in this group received ketoprofen phonophoresis around stitches of episiotomy for 10 minutes, twice daily for 7 days. Also, each patient was asked to perform pelvic floor exercises for 20 minutes, twice daily for 7 days.

The control group (Group B) was consisted of 20 patients. Each patient in this group was asked to perform pelvic floor exercises for 20 minutes, twice daily for 7 days as in group (A).

A- Recording data sheet: All data of each patient in both groups (A&B) were recorded in a data sheet including: Name, age, address, occupation, weight, height, BMI, date of delivery, type of delivery, number of parities, chief complain, diagnosis, past & present history.

B- Visual Analogue Scale (VAS): Graphic rating scale with numerical values that allows continuous data analysis and uses a 100mm line with one anchor (no pain) and other anchor (worst pain) on the end. Patients were asked to put a mark along the line to denote their level of pain. It is found to be a valid and reliable method for pain assessment. The distance from apart of no pain to the point the patient had made was measured.

C- Syringes: They were used to withdrawn blood samples from each paient in both groups (A&B) before and after treatment course in the early morning to measure cortisol level in blood plasma. Three cm of blood from the antecubital vein will be taken before starting treatment sessions and before breakfast for all patients, and also after treatment sessions in both groups (A&B).

D- Weight-height scale: It was used to measure the BMI for each patient in both groups (A&B). BMI = Weight (kg)/Height (m^2) = kg/m^2. It is a valid, reliable and standard weight and height scale.

E- Plinth: It was used for performing pelvic floor exercises and phonophoresis sessions on it.

F- Cotton, alcohol: They were used for sterilization and cleaning the skin before and after the treatment course.

G- Ketoprofen gel (fastum gel): It is non steriodal anti-inflammatory analgesic drug. It is used during application of phonophoresis to all patients in group (A).

H- Ultrasonic device: It was used to treat each patient in group (A).

I- Stop watch: It was used to determine the time of each treatment sessions.

J- Condoms: It was used for avoiding transefer of infections between patients in group (A).

K- Informed consent form.

L- Arm chair: It was used for sitting patient on it to take blood sample.

Evaluative procedures:

1- All data of each patient in both groups (A&B) were recorded in the recording data sheet before starting the treatment course.

2- Weight and height of each patient in both groups (A&B)was measured and BMI was calculated before starting the treatment course.

3- Each patient was asked to sit on arm chair. The antecubital area was cleaned with alcohol. A blood sample of 3cm was withdrawn from the antecubital vein from each patient in both groups

(A &B) by disposable sterile syringe. All the samples were collected in the morning before breakfast for all patients in both groups (A&B) before and after treatment course and were sent immediately to the laboratory center for analysis.

4- Each patient was asked to put a mark on visual analogue scale (VAS) before and after the treatment course to estimate intensity of herpain.

Treatment procedures:

Study group (Group A):

Each patient in this group was asked to lie on her bed in crock lying position with slight abduction in her both lower limbs and the perineal area was uncovered, then the area around stitches of the wound was cleaned with a piece of cotton immersed in dettol perfectly well. Before starting the treatment, complete explanation was given to each patient about what would be done. Be sure that the patient didn't take any certain medications that affect cortisol level in blood such as (morphine, analgesic and antidepressants drugs). Take care that the patient should be free of alcohol intake, caffeine and imbalance caused by other hormones.

After exposing and cleaning the treated area with alcohol, the physiotherapist was covered the transducer head (treatment head) of ultrasonic device with a condom to avoid transferring of infection, then sheholds the transducer head from its handle and put a sufficient amount of ketoprofen gel (fastum gel) on the transducer head and the ultrasonic device was switched on. The ultrasonic device was adjusted at (Frequency: 1MHZ, Intensity: 0.5-1 W/cm^2, Mode: continuous mode, Duration: 10 minutes). Later on, she started to move the transducer head around stitches in a circular movement continuously for 10 minutes.

After that, the ultrasonic device was switched off and the condom was taken off from the transducer head.

Then, each patientwas asked to perform pelvic floor exercises for 20 minutes. This procedure was repeated twice a day for 7 days as the following:

Strengthening exercises for pelvic floor muscles:

A- Strengthening for pubovaginalis: The patientwas asked to lie in supine position with crossed anklesand only one layer of clothes on the lower abdomen to allow clear observation for lowering of lower abdomen.While the therapist was stride standing beside her asking her to contract as if she controls the urethral orifice action, hold then relax. These steps were repeated twice a day.

B- Strengthening for puborectalis: The patient was asked to lie in supine position with crossed ankles. While the therapist was standing beside her and her both hands under the glutei with tips of the fingers around the anus to feel the contraction of the muscle (drawing anus up), then the therapist asked the mother to contract as if she controls the bowel action, concentrate in this action, hold then relax. This exercise was repeated twice daily and any contraction in the glutei was avoided during this exercise.

C- Strengthening for the whole muscle: The patient was asked to lie in supine position with crossed anklesand only one layer of clothes on the lower abdomen to allow clear observation for lowering of lower abdomen.While the therapist was stride standing beside the mother at the level of her pelvis, her both hands under glutei with tips of the fingers around the anus. The therapist's eyes were concentrated on the lower abdomen of the mother to observe the contraction of the pubovaginalis muscles. The therapist asked the patient to contract as if she controls the bowel action, the urethral orifice action and draw her vagina up, concentrate in this action, hold then relax. This exercise was repeated twice daily.

Control group (Group B):

Each patient in this group was asked to perform pelvic floor exercises for 20 minutes, twice a day for 7 days as in group (A).

Results

Table (2) and Figs. (1-3) illustrates mean ± SD for VAS scores before and after treatment for both groups (A & B).

Variables	Group A		Group B	
	Before treatment	After treatment	Before treatment	After treatment
Mean ± SD	3.70±0.47	0.45±0.69	3.80±0.41	2.65±0.93
MD	3.25		1.15	
t# value	20.290		5.205	
p-value	0.001		0.001	
- % of in VAS score after ttt.	87.84%		30.26%	
Significance	Highly significant		Highly significant	

MD = Mean difference.

By comparing the two groups (A & B) after treatment regarding to VAS scores, it was found that, both groups showed a decrease in pain scores after treatment, group (A) achieved 87.84% while group (B) achieved 30.26% but the percentage of decrease in VAS scores was more pronounced and more notable in group (A) when compared with group (B), this means that ketoprofen phonophoresis combined with pelvic floor exercises were more effective than performing pelvic floor exercises lonely in decreasing acute perineal pain after episiotomy.

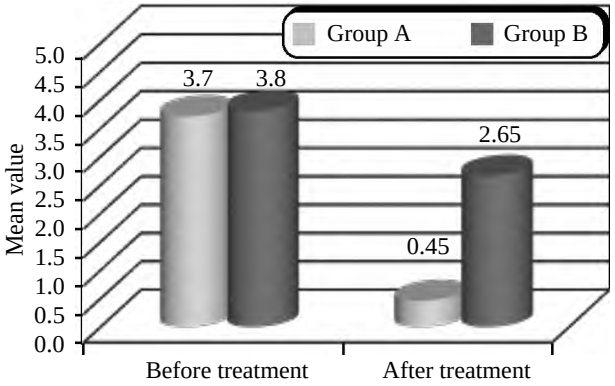

Fig. (1): Illustrates mean values of VAS scores measured before and after treatment in the two studied groups (A & B).

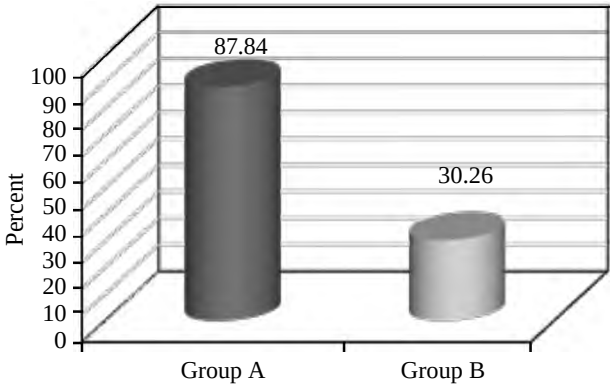

Fig. (2): Illustrates percent of decrease in VAS scores in both groups (A & B) after treatment.

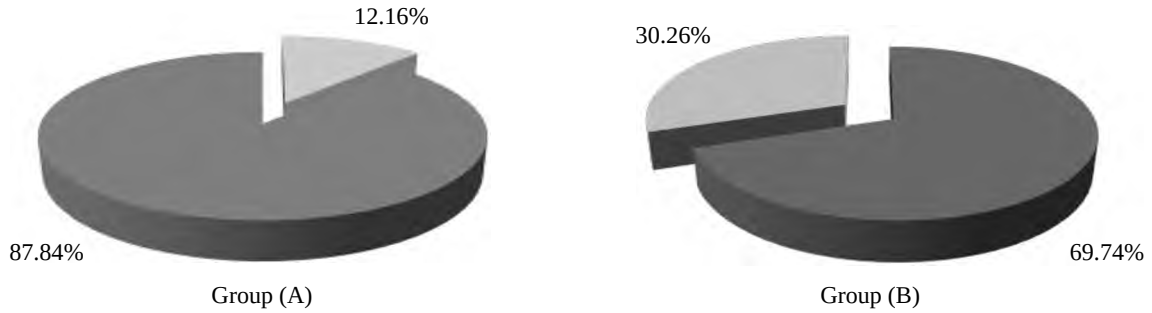

Fig. (3): Illustrates percent of decrease in VAS scores after treatment in both groups (A&B).

Table (3) and Figs. (4-6) illustrates mean ± SD for serum cortisol before and after treatment for both groups (A & B).

Variables	Group A		Group B	
	Before treatment	After treatment	Before treatment	After treatment
Mean ± SD	22.19±1.89	7.84±1.49	22.68±1.69	19.17±2.27
MD	14.35		3.51	
t# value	31.960		9.132	
p-value	0.001		0.001	
- % of in cortisol level	64.67%		15.48%	
Significance	Highly significant		Highly significant	

MD = Mean difference.

By comparing the two groups (A & B) after treatment regarding to serum cortisol level, it was found that, both groups showed a decrease in serum cortisol level after treatment, group (A) achieved 64.67% while group (B) achieved 15.48% but the percentage of decrease in serum cortisol level was more pronounced and more notable in group (A) when compared with group (B), this means that ketoprofen phonophoresis combined with pelvic floor exercises was more effective than performing pelvic floor exercises to relieve acute perineal pain after episiotomy.

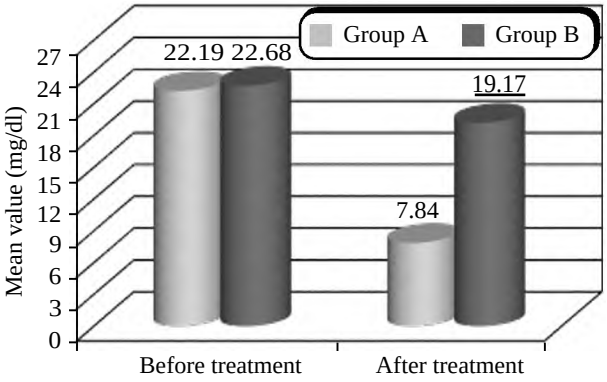

Fig. (4): Illustrates mean values of serum cortisol level measured before and after treatment in the two studied groups (A & B).

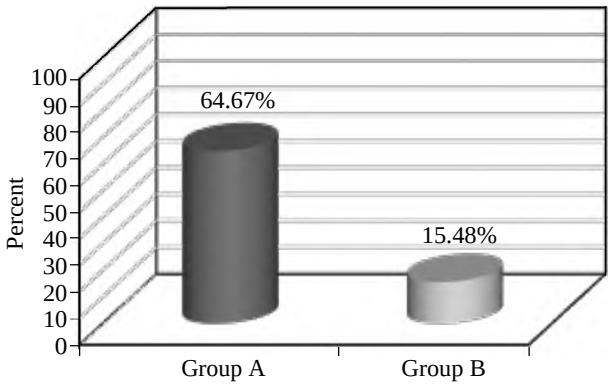

Fig. (5): Illustrates percent of decrease in serum cortisol level in both groups (A&B) after treatment.

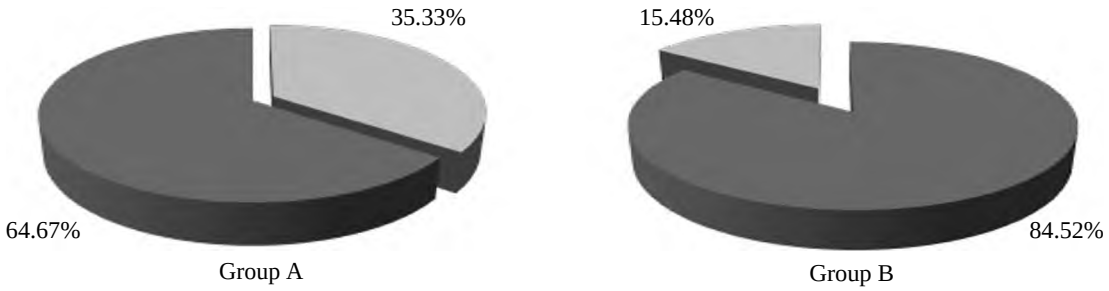

Fig. (6): Illustrates percent of decrease in serum cortisol level after treatment in both groups (A & B).

Discussion

An episiotomy is the most common obstetric surgical procedure performed in the second stage of labor. It is done to reduce the incidence of severe perineal tears (third and fourth-degree) during labor. A controlled incision is made in the perineum to enlarge the vaginal orifice, thereby facilitating a difficult delivery resulting in an easily repairable incision [20].

The results of this study come in agreement with the results of Zhou et al., [21] who stated that, "Ketoprofen phonophoresis is a safe and painless procedure with no side effects like medications. It is a good treatment option to reduce inflammation and relieve acute perineal pain after episiotomy". He added that, "ketoprofen phonophoresis is a fantastic therapy tool to decrease pain & inflammation, accelerate wound healing and help patient to return to her optimal function as quickly as possible".

The results of this study agree with the results of Drukker et al., [22] who reported that, "ketoprofen phonophoresis provides a significant pain-relieving effect for acute perineal pain after episiotomy. It is more effective for pain relieve than medication or using ultrasound alone. Ketoprofen (fastum gel) is a non-steroidal anti-inflammatory analgesic drug. It is commonly used to decrease inflammation, redness, swelling and to relieve pain in soft tissue injuries".

The results of this study are consistent with the results of Woretaw et al., [23] who demonstrated that, "Phonophoresis is the method of using ultrasound waves to increase skin permeability in order to improve the effectiveness of transdermal drug delivery. Phonophoresis is able to achieve specific and efficient delivery of drugs through the skin and ensure that the drug reaches the target area in the tissue environment. So, ketoprofen phonophoresis has a great efficacy on acute perineal pain after episiotomy, it gives amazing results".

Raj etal., [24] demonstrated that, "phonophoresis is the use of ultrasound technology to enhance the body's ability to absorb topically applied analgesic and other anti-inflammatory agents. The goal is to reduce inflammation, relieve pain and improve overall mobility. Ketoprofen phonophoresis was compared with low level laser therapy and ultrasound to treat acute perineal pain after episiotomy, the results showed that, ketoprofen phonophoresis approved to be superior to both". This comes in agreement with the results of the current study.

All experimental studies which made by Cardoso et al., [25] confirmed that, "ketoprofen phonopher-

esis in conjunction with pelvic floor exercises has a great efficacy in the management of acute perineal pain after episiotomy". This consistent with the results of this study.

Conclusion:

It could be concluded that, ketoprofen phonophoresis is an effective method for treating acute perineal pain after episiotomy.

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فعالية ادخال مادة الكيتوبروفين بواسطة الموجات الفوق صوتية على الالام الحادة للعجان بعد شقها جراحياً أثناء الولادة

تهدف هذه الدراسة الى فعالية ادخال مادة الكيتوبروفين بواسطة الموجات الفوق الصوتية على الالام الحادة للعجان بعد شقها جراحياً أثناء الولادة. تم اجراء هذه الدراسة على أربعين امراة يعانين من الالام الحادة للعجان بعد شقها جراحياً أثناء الولادة تم اختيارهم من مستشفى دار اسماعيل للولادة، تراوحت أعمارهم ما بين ٢٠ و ٣٠ عاماً، لم يتعدى مؤشر الكتلة ٣٠ كجم/م٢، ولم يسبق لهم الولادة تم توزعيهم عشوائياً فى مجموعتين متساويين فى العدد مجموعة (أ) اشتملت هذه المجموعة على عشرين مريضة، تلقت هذه المجموعة العلاج عن طريق مادة الكيتوبروفين المدخلة بواسطة الموجات الفوق الصوتية لمدة ١٠ دقائق، مرتين يومياً لمدة ٧ أيام بالاضافة إلى تمارين قاع الحوض العلاجية لمدة ٢٠ دقيقة مرتين يومياً لمدة ٧ أيام. مجموعة (ب) اشتملت هذه المجموعة على عشرين مريضة، تلقت العلاج عن طريق تمارين قاع الحوض العلاجية لمدة ٢٠ دقيقة مرتين يومياً لمدة ٧ أيام. وقد تم تقييم المرضى قبل وبعد العلاج باستخدام مقياس النظرى البصرى وقياس نسبة الكورتيزول فى الدم. وقد أسفرت النتائج أن نسبة التحسن فى مقياس شدة الألم ونسبة الكورتيزول فى الدم فى المجموعة (أ) أعلى من مجموعة (ب) مما يعنى أن مادة الكيتوبروفين المدخلة بواسطة الموجات الفوق الصوتية كانت أفضل فى علاج الالام الحادة للعجان بعد شقها جراحيا أثناء الولادة. نستخلص من نتائج البحث أن مادة الكيتوبروفين المدخلة بواسطة الموجات الفوق الصوتية ذو فاعلية فى تحسن الألم لدى السيدات الاتى يعانين من الالام الحادة للعجان بعد شقها جراحياً أثناء الولادة.