Paracervical Block for Oocyte Retrieval: Experience at a Public Health Facility in Nigeria

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Abstract

Background: Transvaginal Ultrasound Guided Oocyte Retrieval (TUGOR) for in vitro fertilization is one of the most common minor surgical procedures. Despite this, it is stressful and painful for the patient and thus requires some form of analgesia with or without sedation. The effects of various anesthetic techniques used for TUGOR on reproductive outcomes remain controversial.

Aims: This study assessed patients' perception of pain using paracervical block and its effect on IVF outcomes.

Methods: A cross sectional study of 66 eligible patients that underwent assisted reproduction program in our facility. All clients were treated with antagonist protocol for Controlled Ovarian Hyperstimulation. Self- administered questionnaires was used as the research instrument. Pain was assessed using a 10cm Visual Analogue Scale while clients' overall satisfaction was rated using Likert scoring system.

Results: Client's aged 32.8 ±3.4. More than half had primary infertility with mean duration of 4.6 ± 2.4. Female factor infertility was the commonest cause of infertility. The pregnancy rate per embryo transfer was 36.4%, miscarriage rate was 9.1%, while the live rate was 27.3%. The mean VAS scores at 1hour, 6 hours, 24 hours and at embryo transfer were 7.1 ± 2.8, 4.6 ±1.4, 2.8 ±1.2 and 1.0 ± 0.9 respectively. The mean Likert score was 2.4 ± 0.9.

Conclusion: Paracervical block is a safe and effective anaesthesia/ analgesia option for TUGOR.

However a multimodal approach of analgesia/anaesthesia for TUGOR is recommended to further improve on clients' satisfaction and acceptance.

Keywords: In vitro fertilization, oocyte retrieval paracervical block,anaethesia, Nigeria,.

INTRODUCTION

In vitro fertilization (IVF) requires the harvesting of mature oocytes from the ovaries of infertile patients which are subsequently fertilized in vitro and allowed to develop into embryos that are finally transferred into the uterus of these patients. [1], [2], [3]

Oocyte retrieval is reported to be the most painful step of the IVF procedure, and various methods of analgesia are in use.Pain during oocyte retrieval is caused by the puncture of the vaginal skin and ovarian capsule by the aspirating needle as well as manipulation

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within theovary during the entire procedure. Here it becomes customary for the anaesthetist to provide adequate pain relief to immobilise the patient and eliminate the danger of piercing any vessel during the process of oocyte retrieval. [4], [5]

A good analgesic method for oocyte retrieval has to give satisfactory pain relief with rapid onset, rapid recovery and ease of administration and monitoring. It is also important that it is safe and has no toxic effects on the oocytes. [6] We therefore present our experience with paracervical block for TUGOR on clients' pain perceptions and IVF outcomes

PATIENTS AND METHODS

This is a cross-sectional study of 66 patients that underwent IVF-ET at the Assisted Reproductive Technology (ART) unit of the University of Ilorin teaching hospital (UITH), Ilorin between 1st January, 2013 and 31st December, 2017. Client's folder was assessed for information such as demography, cause of infertility, duration of infertility, type of stimulation protocols, duration of FSH used/ dosage and endometrial thickness . Paracervical block was used as anaesthesia for all 66 patients based on clients' and or clinicians' preference. Informed consent was obtained from the clients and protection of personal data and confidentiality were priortized. Inclusion criteria were normo-responders (age less than 40 years), clients' with normogonadotrophic normogonadism, first attempt at TUGOR and those consented to participate in the study while the exclusion criteria included clients' who are allergic to anaesthetic agents, with cardiopulmonary compromise, thyroid dysfunction, whose TUGOR exceeded more than 30 minutes and those required other forms of analgesia for pain relief during TUGOR.

Seminal Fluid Analysis was conducted for male partners. The criteria for men were a sperm count of at least 20 million cells per milliliter of semen and progressive sperm motility of 50% or greater. Male partners with semen count and/or motility less than the cut-off values were offered Intracytoplasmic Sperm Injection (ICSI) unless the sperm count was zero after centrifugation; therefore donor sperm was used for in vitro fertilization.

All clients had a Body Mass Index (BMI) (calculated as weight in kilograms divided by the square of height in meters) ranging between 18 and 30 with a mean of 24 ± 4 Kg/m2. All had antagonist protocol for Controlled Ovarian Hyperstimulation. Their infertility evaluation results were normal. Also, all had oral contraceptive pills (OCP) for menstrual cycle synchronization and pre-cervical assessment (trial/dummy transfer) on day 2/3 of menses prior to commencement of stimulation.

Stimulation Protocol

Clients was commenced on 150IU (2vials) of recombinant FSH Gonal F (Gonal F(R); Merckserono, Germany) and 75 IU (1 vial) highly purified FSH (Folliculin®; Barrat pharmaceutical, India) on day 3 of menstrual cycle for 11-14 days. Transvaginal ultrasonographic scan was also done at interval from day 5/6 of stimulation to determine the numbers, size of follicles and endometrial thickness. Subcutaneous 2.5mg daily GnRH antagonist (Cetrotide ®; merckserono, Germany) was administered whenever the follicles have grown to 14mm size usually around day 6/7 of stimulation and was continued till the day of trigger to prevent premature LH surge. Eight three micrograms (83µg [2000IU]) of recombinant Human Chorionic gonadotrophin (hCG: Ovitrelle; merckserono, Germany) and 0.25mg of buserelin (Supricure ®; Aventis Pharm, West Malling, UK) were administered subcutaneously for trigger whenever 2 or more follicles have grown to 18mm or more and oocyte retrieval was carried out at 35.5hours thereafter.

Anaesthesia/analgesia for Oocyte retrieval

All clients were counseled to fast overnight and 1mg of Atropine was administered intravenously as pre-anaesthetic medication. Paracervical block (PCB) was carried out with the aid of a specially designed needle of 0.9 mm diameter and 120 mm length (Mediplast AB, Malmö, Sweden) and a total of 100mg (10 ml of 1% lidocaine, Xylocain™ 10 mg/ml, AstraZeneca Sverige AB) was injected into lateral fornices between three and four o'clock and eight and nine o'clock position [2.5ml (25mg of 1% lidnocaine) at each position] after which TUGOR was commenced within 5 minutes of administration.

Oocyte retrieval, insemination,embryo transfer and luteal phase

Oocyte retrieval was done at 35.5 hours of hCG injection by TUGOR with the aid of 17G needle (Origio®, Denmark) and the aspirate in a test tube was transferred immediately to the laboratory for oocyte screening and pickup. Mature oocytes were inseminated with prepared sperm after six (6) hours of oocyte pickup and incubated. ICSI was done in cases of severe male factor infertility. Best cleavage embryos were transferred on day 5 of oocyte retrieval usually at the blastocyst stage under trans-abdominal ultrasound guidance and the transfer catheters were checked to ensure all the embryos were transferred. The number of embryo transferred was individualized, 2 or 3 in most cases. The luteal phase support was conducted with progesterone (800mg twice daily [cyclogest pessaries®; Cox, Brarnstaple, UK] and Intramuscular 100mg twice weekly [Gestone ®;Ferring, pharmaceutical, Mumbai, India]). Serum pregnancy test was carried out two weeks after embryo transfer and subsequently transvaginal ultrasound at 6th week for detection of gestational sac and /or viability of the fetus.

Visual Analog Scale (VAS) and Likert score

Following TUGOR, clients had self administered questionnaire administered to assess their perception of pain using VAS scoring system [6] on a scale of (0-10cm) at 1hr, 6hrs, and 24hrs and on the day of embryo transfer respectively and their responses were properly documented. VAS scoring was graded as 0- no pain, 1-3 – mild pain, 4-6 – moderate pain and 7-10 – severe pain. Also overall clients' satisfaction were assessed through Likert scoring system [7] on a scale of (1-5) categorized as 1- poor, 2- fair, 3- satisfactory, 4- very good and 5- Excellent.

Statistical analysis

Statistical analysis was done using Microsoft excel version 2007 and Epi-info version 7.1.3.0 (Centres for Disease Control and Prevention-CDC, Atlanta, USA), Categorical data were expressed as numbers and percentages while numerical data were expressed as mean and standard deviation. Associations of categorical variables were tested using Chi square test, while statistical significance was set at $p \leq 0.05$. Results were presented in tables.

Results

The characteristics of the women who underwent IVF-ET cycles and their spouses are shown in Table 1. The mean age of the women and their spouse were 32.8 ± 3.4 and 38.7 ± 4.4 respectively. The mean duration of infertility was 4.6 ± 2.4, most of the couple presented with primary infertility (53%), while female factor infertility was the predominant cause of infertility (40.9%).

The mean duration of FSH, Mean FSH ampoule used and endometrial thickness were 14.3 ± 1.9, 32.7 ± 4.8 and 8.8 ± 2.1 respectively. The mean number of oocyte retrieved and mean number of oocyte fertilized were 10.0 ± 4.3 and 6.1 ± 3.2 respectively. (Table 2)

The clinical pregnancy rate per embryo transferred was 36.4%, miscarriage rate was 25%, while live birth rate was 27.3%. (Table 3).

Table 4 shows patient perception of pain and satisfaction. The mean VAS score at 1hour, 6hours, 24 hours and at embryo transfer were 7.1 ± 2.8, 4.6 ± 1.4, 2.8 ± 1.2 and 1.0 ± 0.9 respectively. The mean Likert score was 2.4 ± 0.9.

Discussion

In this study, the mean age of the clients and the mean number of oocytes retrieved were 32.8 ± 3.4 and 10.0 ± 4.3. This is comparable with the mean age of 33.7 ± 4.9 and means number of oocytes retrieved of 13.31 ± 9.04 obtained in a similar study in Nigeria. [3] Also, female factor infertility was the commonest cause of infertility in our series. On the contrary combined male and female factors predominate in an earlier study at Tamil, India. [7] This could be attributed to dissimilar geographic locations of both studies.

The clinical pregnancy rate per embryo transfer of 36.4% is comparable to 29.6% documented in a previous study. [8]However, there exits controversies regarding the effects of anaesthetic agents administered during TUGOR on fertilization, embryonic development and conception rate. [9-11]. A possible risk associated with PCB is the potential toxicity of absorbed lidocaine. [12], [13] Follicular fluid lidocaine concentrations as low as 1.0 µg/ml were associated with toxic effects on fertilization and embryo development in a mouse model. [13]

On the contrary there is no evidence of adverse events associated with lidocaine PCB usage in human. [13] Mean follicular fluid lidocaine concentration was 0.36 ± 1.1µg/ml after PCB with 50 mg of lidocaine. [12] Undoubtedly, exposure to high concentrations of different local anesthetic agents adversely affects fertilization and embryonic development. [14] However, given that much lower concentrations of lignocaine (100mg) was administered in this study and that oocytes were washed after retrieval, the clinical effects of using local anesthetics should be limited and probably no adverse effects should occur.[7], [12]

These could be responsible for the `clinical pregnancy rate of 36.4% reported in our series. However, no single method of anaesthesia/analgesia for TUGOR appeared superior for pregnancy rates and pain relief as observed in a randomized controlled trial. [15] Thus the need for a multimodal approach to anaesthesia /analgesia for oocyte retrieval.

The mean VAS score at 1hour, 6hours, 24 hours and at embryo transfer of 7.1 ± 2.8, 4.6 ± 1.4, 2.8 ± 1.2 and 1.0 ± 0.9 obtained in our study is higher than 2.83 ± 1.67, 0.78 ± 1.04, 0.39 ± 1.09, and 0.14 ± 0.58 reported in a similar study in Tamil, India that used conscious sedation for anaesthesia/analgesia during TUGOR. [16]This is in keeping with findings from a previous study that shows that patients who received only paracervical block during oocyte collection experienced 2.5 times higher levels of vaginal and abdominal pain than those who received conscious sedation and or paracervical block. [12] However paracervical block for pain relief during oocyte aspiration compared with placebo was associated with lower pain scores for oocyte retrieval process. [17]

The overall clients' satisfaction was assessed with Likert scoring system. The mean Likert score of (2.4 ± 0.9) ranging between fair and satisfactory obtained in this study is lower compared with mean Likert score of 3.65 ± 0.82 reported in a previous study in Tamil Nadu, India where conscious sedation (Pethidine and Midazolam combination) was employed for anaesthesia/analgesia during TUGOR with high client satisfaction and acceptance. [7] This underscores the need to compliment paracervical block with other forms of anaesthesia/analgesia to improve on its effectiveness and acceptance for pain relief during TUGOR.

Conclusion:

This study showed that paracervical block has no detrimental effects on fertilization and embryonic development although its effectiveness and acceptance for pain relief during TUGOR is restricted. Hence the need for patient selection for paracervical block during TUGOR. We recommend a multimodal approach to anaethesia/analgesia during TUGOR to further enhance clients' satisfaction. Also, randomized prospective studies with larger sample sizes are advocated to validate our findings.

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Conflict of interest:

There is no conflict of interest.

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Table 1: Sociodemographic characteristics

Variables	Frequency	Percentage
Age(years)		
25-29	12	18.2
30-34	35	53.0
35-39	15	22.7
40-44	4	6.1
Mean= 32.8 ± 3.4	**range= 27-40**	
Age (spouse)		
30-34	11	16.7
35-39	29	44.0
40-44	17	25.8
45-49	7	10.6
50-54	2	3.0
Mean= 38.7 ± 4.4	**range=31-50**	
Parity		
P0	34	51.5
P1	15	22.7
P2	6	9.1
P3	8	12.1
P4	3	4.5
Duration of infertility		
1-5	46	69.7
6-10	18	27.3
11-15	2	3.0
Type of infertility		
Primary	35	53.0
Secondary	31	47.0
Cause of infertility		
Male Factor	14	21.2
Female Factor	27	40.9
Male/Female Factor	16	24.2
Unexplained	9	13.6

Table 2: Stimulation cycle characteristics of the clients

Variables	Mean
Duration of FSH	14.3 ±1.9
FSH ampoule used	32.7 ± 4.8
Endometrial thickness	8.8 ± 2.1
No. of oocytes retrieved	10.0 ±4.3
No. of oocyte fertilized	6.1 ±3.2

Table 3: Clinical outcome

Outcome	Frequency n=66	Percentage
Clinical Pregnancy per ET	24	36.4
Miscarriage rate	6	9.1
Live birth rate	18	27.3

Table 4: clients' perception of pain and satisfaction

VAS score	Mean
VAS at 1hour	7.1 ± 2.8
VAS at 6 hour	4.6 ± 1.4
VAS at 24 hour	2.8 ± 1.2
VAS at ET	1.0 ± 0.9
Likert	2.4 ±0.9