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RESEARCH ARTICLE

SPINAL ANAESTHESIA FOR ULTRASOUND GUIDED FOLLICULAR ASPIRATION FOR OOCYTE RETRIEVAL USING 1ML OF ISOBARIC BUPIVACAINE (0.5%) AND 25µg FENTANYL

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ABSTRACT

Objective: To investigate the efficacy and safety of a very low dose of isobaric bupivacaine with fentanyl for trans-abdominal/ vaginal oocyte retrieval for invitro fertilization in situations where it was difficult to access the oocyte through the vagina and would require anaesthesia.

Design: setting. It is a prospective study that involved thirty-six adult females that presented at a fertility centre in Port-Harcourt Nigeria with difficulties to access oocytes through the vagina under sedation and had requirement for better relaxation under anaesthesia between August 2014 and January 2018.

Methodology: Single shot spinal anaesthesia was administered using 5mg of isobaric bupivacaine with 25µg of fentanyl following written consent for regional anaesthesia.

Results: All thirty-six women were successfully administered low dose spinal bupivacaine and fentanyl with ease of ultrasound guided trans-abdominal/ vaginal retrieval of oocytes withno obvious complications.

Conclusion: Low dose spinal bupivacaine with fentanyl is a potent and safe technique for ambulatory trans-abdominal oocyte retrieval with very minimal complications.

Key words: Spinal Anaesthesia, Ultrasound Guided Oocyte Retriaval, Isobaric Bupivacaine, Fentanyl.

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INTRODUCTION

Infertility is common in Nigeria with an estimated ratio of 1:4 couples having delay in conception (Azoma, 2017). The socio-economic and psychological burden that are associated with infertility is enormous and drive the evolution and rapid development of assisted reproduction since the first test tube baby was delivered in Nigeria in the 80s. In- vitro fertilization (IVF) has come to stay in Africa with its attendant benefits to many families including bringing in an atmosphere of joy and fulfillment when successful. There are many procedures that are associated with assisted reproduction and these start from ovarian stimulation through ultrasound guided oocyte retrieval through the vagina and or abdomen (Divya *et al.*, 2009) to in-vitro impregnation and embryo transfer (Tsen and Vincent, 2009) (Gindoff *et al.*, 1994). These processes are usually associated with lots of anxiety (Shahrzad *et al.*, 2014) (Hayes *et al.*, 1987) and can contribute to reducing the threshold for pain (Kwan *et al.*, 2013) during trans-abdominal or vaginal oocyte retrieval especially as the process involves the irritation of the peritoneum and puncturing of ovarian follicles.

The primary outcome of IVF is to produce healthy embryo(s). This places much emphasis on the medications that are administered in the course of the procedures, associated with oocyte retrieval. The essence of this observation is borne out of the fact that some sedatives or anaesthetic drugs have harmful effects on the oocytes (Gonen *et al.*, 1995) and some have been found in significant quantities in the follicular fluids (Sharma *et al.*, 2015). This demonstrates the need for a safer anaesthetic agent that will have very minimal effect on the quality of the oocyte and also provide favourable outcome. Oocyte retrieval procedures cause pain and the earliest technique for retrieval was by laparoscopy (Tanbo *et al.*, 1988) which has been abandoned for conscious sedation in most centres (Fiebai *et al.*, 2008) and which is solely administered by the gynaecologists. The following anaesthetic techniques; general anaesthesia or regional anaesthesia have all been described (Bokhari *et al.*, 1999). The aim of this prospective descriptive study was to determine the safety, efficacy and adequacy of using low doses of isobaric bupivacaine with fentanyl. Spinal bupivacaine is routinely used in obstetrics and the safety profile of the drugs used has been studied and acceptability of the procedure is universally guaranteed.

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MATERIALS AND METHODS

It was a prospective descriptive study that was conducted on patients who presented at a fertility clinic in Port-Harcourt Nigeria, between August 2014 to January 2018. The anaesthetic technique and the medications that were utilised in this study are routinely practised at the study centre. Ethical clearance and written consent for the procedure was obtained from the institution and patients respectively. Nulliparous and infertile women who were undergoing treatment for assisted reproduction and had difficulties with oocyte retrieval per vagina for reasons such as the presence of uterine fibroids, adhesions and who required better relaxation for ease of retrieval of oocytes either through the vagina or per abdomen were studied. Exclusion criteria included refusal to consent for spinal anaesthesia and the absolute contra-indications to regional anaesthesia. The patients were reviewed and counselled for spinal bupivacaine on the same day of the procedure and were administered 500ml of preloading fluids. Single shot spinal technique using 26G pencil point Whitaker spinal needle was used and 5mg (1ml) of isobaric bupivacaine with 25µg (0.5ml) of fentanyl was administered. The block characteristics, onset of intrathecal bupivacaine, maximal sensory block level, Modified Bromage score, time to ambulation unaided and side effects were assessed. Data was entered into a spread sheet and analysed using the Statistical Package for Social Sciences (SPSS) 18.0 for windows and Winpepi version 9.7. Student t-test and chi squared test were used to analyse numerical and categorical variables respectively.

RESULTS

Thirty-six females were studied. The mean age of the study population was 37.6 ± 0.96 years. Mean onset time of spinal bupivacaine was 3.14 ± 0.12 minutes, Median maximal sensory block level was T8 (interquartile range T6-T10). Median Bromage score after 10 minutes was 3 (interquartile range 2 – 3) and mean time to ambulation unaided was 151.42 ± 1.41 minutes after institution of spinal anaesthesia. The mean duration of surgery was 23.22 ± 1.03 minutes. There was no incidence of any cardiovascular complications.



Ultrasound guided oocyte retrieval per abdomen under very low dose spinal anaesthesia

Consent for photograph obtained from the patient for use in this publication



Table 1. Illustrating the summary of perioperative events

Mean age	37.6±0.96years
Mean onset of spinal bupivacaine	3.14±0.12 minutes
Median sensory block	T8(T6-T10)
Median Bromage score(10mins)	3(2-3)
Mean time to ambulation(unaided)	151.42±1.41minutes
Mean duration of procedure	23.22±1.03minutes

DISCUSSION

This was the first attempt to utilise the single shot spinal anaesthesia with very low dose of isobaric bupivacaine with fentanyl for trans-abdominal and or transvaginal oocyte retrieval at the study centre and possibly the first report from Nigeria. Conscious sedation is commonly done for most transvaginal oocyte retrieval¹¹ and is solely undertaken by the gynaecologists and the tendency for airway compromise cannot be ruled out in situations where the duration of retrieval becomes longer and in very anxious patients. The recourse to involve the anaesthetists in this study was prompted by the difficulties to access oocytes from with difficulty to access the ovaries. Multiple puncturing during oocyte retrieval causes pain especially in very anxious and emotionally upset patients¹³. Conscious sedation requires the use of a combination of medications such as propofol, fentanyl and midazolam or midazolam and fentanyl combination with the risk of airway compromise if large doses are required especially in prolonged procedures. In a study by Fiebai *et al.* (2008), the mean dose of pethidine used was about 100mg (range 100-200mg) and it was combined with midazolam. It was observed in their study that about 30% of the patients would prefer a larger dose of pethidine to achieve adequate analgesia. Such a dose for a single operator with little training in advanced air way management could result in respiratory compromise which affects the safety of the procedure. Although no anaesthetic technique is the most superior, Divya *et al.* (2009), had observed that the safety, ease of administration, duration of action and associated side effects on both the oocytes and the patient, determine the ideal anaesthetic technique for assisted reproduction. Spinal anaesthesia has been successfully used to provide both relaxation and adequate analgesia (Martin *et al.*, 1999) (Viscomi *et al.*, 1997) with the patient actively participating in the retrieval process. The use of spinal bupivacaine is not novel at the study centre and it is common in gynaecological and obstetric practice and the dose used in this study is smaller than the dose that is commonly used in obstetrics. Its safety profile has been widely studied (Endler *et al.*, 1985 and Vlahos *et al.*, 2009).

In our study, isobaric bupivacaine was used while some other studies utilised heavy lidocaine and the difference between the two drugs was not significant (Tsen *et al.*, 2001 and Martin *et al.*, 1999). Heavy lidocaine was not available in our centre and with a reported higher incidence of transient neurological syndrome, it is unsafe to add more problems to a distressing patient. However, Tsen *et al.* (2001), in comparing bupivacaine with lidocaine would prefer bupivacaine as a viable option. Bupivacaine is readily available and accessible and has limited neurological side effects in low doses. In a comparative study to assess the pregnancy outcome between patients undergoing invitro fertilization under general anaesthesia and spinal anaesthesia, it was observed that spinal anaesthesia provided a better platform to achieve quality oocytes and successful fertilization (Azmude *et al.*, 2013). The analysed doses of the local anaesthetic in the follicular fluid were found in insignificant levels which do not affect the fertilization outcome as compared to general anaesthesia where significant levels of some medications have been found in follicular fluids (Azmude *et al.*, 2013; Balki *et al.*, 2005; Phillips *et al.*, 2007 and Wilkins *et al.*, 2009).

The duration of the procedure is usually short. With adequate relaxation, visibility and access become easier. The observation of Fiebai *et al.* (2008) in respect of the duration of the retrieval process was similar to the result obtained in this study. The risk of respiratory compromise should not be sacrificed on the basis of short procedures. The onset and offset times for spinal bupivacaine is adequate for a procedure that is associated with lots of anxiety and expectations. In terms of the demographic distribution of the patients, our observation was not different from what other workers noted¹¹. The onset time of spinal bupivacaine was comparable with that observed by Tsen *et al.* (2001) using spinal lidocaine. One of the drawbacks to the use of spinal bupivacaine in the ambulatory setting is the duration of motor block and delay to void. These discomforts are considered minor in the face of the airway complications that may arise from conscious sedation with large doses of propofol, pethidine or midazolam in an unprotected airway.

Conclusion

Low dose isobaric bupivacaine with fentanyl is a safe, effective and potent combination for procedures that are basically considered ambulatory for assisted reproduction and with minimal complications.

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