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A comparative study between general anesthesia and conscious sedation for oocyte retrieval on hemodynamic recovery and oocyte quality

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Abstract---Background: In vitro fertilization (IVF) is a four-stage procedure, ovarian stimulation and monitoring, oocyte retrieval, fertilization and embryo transfer. Transvaginal ultrasound–guided follicle aspiration is the most common method for oocyte retrieval in assisted reproductive technologies, it is increasingly performed as an outside procedure. Objective: To compare between general Anesthesia and Conscious Sedation according to Oocyte Retrieval on hemodynamic recovery and oocyte quality. Methods: Seventy women underwent oocyte retrieval in the period from November 2021 till June 2022 at High Institute of Infertility Diagnosis and Assisted Reproductive Technique, Reproductive Physiology, Al-Nahrain University in Baghdad, Iraq, were included in this study. Results: Mean time needed for operation was 9.06± 1.39 minutes in conscious group and 9.84± 1.11 minutes in GA group, and the recovery time needed was 2.31± 0.47 hours in conscious group and 10.78± 1.87hours in GA group. Conclusion: Significant decrease in duration of operation in conscious group than that in general anesthesia group (P=0.01), moreover, highly significant decrease in recovery time in conscious group than that in GA group (P<0.001)

Keywords---conscious sedation, general anesthesia, oocyte retrieval.

Introduction

Infertility is a significant problem worldwide, its impact is multidimensional where it is well known that infertility has an impact on the mental health of infertile couples, such as anxiety and depression and even the sexual function, on the other hand its impact extends to quality of life and the acceptability of treatment modalities [1]. So over time, different assisted reproduction techniques, like ICSI and other techniques have emerged and facilitate the possibility of achieving a pregnancy more and more frequently [2,3], however, there are still few countries with public strategies that can support this problem, and those in developing countries cannot do so because it is very expensive, in the past three decades , ART became available particularly in private clinics but rarely in publicly funded institutes [4].

In addition, it is necessary to determine the assisted reproduction technique (ART) that offers the best results for the specific couple; therefore, different clinical guidelines are implemented but no standard one can be utilized in all circumstances [5]. In the last years, there is an increase in the number of couples who decide to get ART. Therefore, it is important to fully understand the implications of these techniques, especially those related to the anesthesia. It should be remembered that pelvic puncture and manipulation are very painful, as they involve pain in the vagina and ovarian capsule. Hence, anesthetic considerations in assisted reproductive techniques are important issues for clinicians, ART specialists and anesthesiologists [6].

Aim of the study

To compare between general Anesthesia and Conscious Sedation according to Oocyte Retrieval on hemodynamic recovery and oocyte quality.

Patients and Method

seventy women underwent oocyte retrieval in the period from November 2021 till June 2022 at High Institute of Infertility Diagnosis and Assisted Reproductive Technique, Reproductive Physiology, Al-Nahrain University in Baghdad, Iraq, were included in this study. Of these,35 patients had general anesthesia (group A) and 35 patients had conscious sedation (group B). In the general anesthesia group, induction was achieved with intravenous sleeping dose of Propofol 2- 2.5 mg/kg. In conscious sedation group by Remifentanil 50µg IV. Further doses of either drug was administered according to the patient's need.

Results

No significant difference was found between preoperative and postoperative blood pressure (systolic and diastolic) between both studied groups (P>0.05), (Table 1). Moreover, no significant difference found between the groups according to pre and post op heart rate (P>0.05) (Table 2)

Table 1
Comparison between Conscious and GA groups according to BP

Variables		Conscious (n=35)		GA (n=35)		P. value
		Mean	SD	Mean	SD	
Pre-Op BP	Systolic	130.6	9.2	129.46	11.1	0.6 ns*
	Diastolic	75.6	8.26	78.8	6.69	0.07 ns*
Post-Op Bp	Systolic	122.2	12.0	121.03	8.9	0.6 n*s
	Diastolic	71.06	8.87	73.4	7.38	0.2 ns*
*: Independet t-test, ns: not significant,						

Table 2
Comparison between Conscious and GA groups according to HR and SPO2

Variables	Conscious (n=35)		GA (n=35)		P. value
	Mean	SD	Mean	SD	
Pre op HR	86.3	8.5	86.4	7.19	0. 9 ns*
Post op HR	82.09	7.3	83.59	4.83	0.2 ns*
SPO2	100	0	100	0	-
*: Independet t-test, ns: not significant,					

The mean level of E2 in pre opu serum was 1145.6± 496.739 in conscious group and 1409.36±650.321 in general anesthesia group with no significant difference (p=0.06), mean of Oocyte number was 9.88± 4.916 in conscious group and 11.09±5.03 in GA group with no significant difference (p=0.3). Mean of Oocyte abnormal was 1.55± 0.881 in conscious group and 1.9± 1.3 in GA group with no significant difference (p=0.1), mean of Oocyte rupture was 1.41± 0.668 in conscious group and 1.769± 0.926 in GA group with no significant difference (p=0.06), mean number of fertile oocytes was 6.2± 3.616 in conscious group and 5.75± 2.839 in GA group with no significant difference (p=0.5) (Table 3).

Table 3
Comparison between Conscious and GA groups according to oocyte in Pre-opu serum

Variables	Conscious (n=35)		GA (n=35)		P. value
	Mean	SD	Mean	SD	
E2	1145.6	496.739	1409.36	650.321	0.06 ns*
Oocyte number	9.88	4.916	11.09	5.03	0.3 ns*
Oocyte abnormal	1.55	0.881	1.9	1.3	0.1 ns*
Oocyte rupture	1.41	0.668	1.769	0.926	0.06 ns*
N. of fertile oocytes	6.2	3.616	5.75	2.839	0.5 ns*
*: Independet t-test, ns: not significant.					

Germinal vesicle oocyte (GV) mean level was 2.22± 1.308 in conscious group and 3.0± 2.20 in GA group with no significant difference (p=0.07), mean level of

metaphase I (MI) oocyte was 2.73± 1.823 in conscious group and 3.266± 2.79 in GA group with no significant difference (p=0.3), and mean level of metaphase II (MII) oocyte was 6.25± 4.218 in conscious group and 6.22± 4.10 in GA group with no significant difference (p=0.9) (Table 4).

Table 4
Comparison between Conscious and GA groups according to fertility parameters pre- opu serum

Variables	Conscious (n=35)		GA (n=35)		P. value
	Mean	SD	Mean	SD	
Germinal vesicle oocyte (GV)	2.22	1.308	3.0	2.20	0.07 ns*
Metaphase I (MI) oocyte	2.73	1.823	3.266	2.79	0.3 ns*
Metaphase II (MII) oocyte	6.25	4.218	6.22	4.10	0.9 ns*
*: Independet t-test, ns: not significant.					

Mean time needed for operation was 9.06± 1.39 minutes in conscious group and 9.84± 1.11 minutes in GA group, and the recovery time needed was 2.31± 0.47hours in conscious group and 10.78± 1.87hours in GA group. Significant decrease in duration of operation in conscious group than that in general anesthesia group (P=0.01), moreover, highly significant decrease in recovery time in conscious group than that in GA group (P<0.001) (Table 5).

Table 5
Comparison between Conscious and GA groups according to duration of operation and time of recovery

Variables	Conscious (n=35)		GA (n=35)		P. value
	Mean	SD	Mean	SD	
Duration of operation(minutes)	9.06	1.39	9.84	1.11	0.01 s*
Recovery time (hours)	2.31	0.47	10.78	1.87	<0.001 Hs*
*: Independet t-test, HS: highly significant, sig: significant					

Discussion

Regarding the vital signs of the patients in both studied groups, no significant change occurred postoperatively than their baseline preoperative levels in both groups which reflect the safety of the used agents and good monitoring of patients during the procedures. Previous studies that used similar agents to those used in our study documented similar findings; in a randomized clinical trial, Lier et al. used remifentanil as an alternative analgesic instead of pethidine in oocyte retrieval in IVF/ICSI among 38 patients who received remifentanil at five minutes prior to procedure of oocyte retrieval and the vital signs were assessed until the 10th min. post puncture this time selected in accordance with half-life of remifentanil, Lier et al. found no significant difference in vital signs during the procedure but 5 patients developed desaturation with an SPO2 of <92%, however, the did not require any intervention due to fast recovery after taking a deep

breath [7]. In our study no significant difference between remifentanil and propofol groups was reported, however, previous studies documented the that remifentanil was not associated with toxic effect but the effect of propofol still controversial. Additionally, some experimental studies stated that propofol could have negative effect on the oocyte ability to be fertilized [8].

All patients in our steady are well prepared so they have good number of normal oocytes where almost 84% of women had normal oocytes that are ready for retrieval, nonetheless, we still have some abnormal oocytes in almost 16% of patients in both groups and this could be attributed to female factors that are not clearly disclosed such as those with unexplained infertility. Our findings close to that reported by an Iraqi study conducted by Mohsen et al. in 2020 who reported a mean total number of oocytes of almost 11.5. Also, Mohsen et al. study found that abnormal oocyte rate was 6-14% [9]. Another study from Iran conducted by Farzi et al. in 2019 reported a mean number of retrieved oocytes of 10.3 [10].

In the present study the mean operation time was significantly longer in GA group than conscious group where the mean operation time was 9.06± 1.39 minutes in conscious group and 9.84± 1.11 minutes in GA group, on the other hand the recovery time was much longer in GA group than conscious group, where the mean recovery time was 10.78± 1.87 hours and 2.31 ± 0.47 in GA and conscious groups, respectively, ($P<0.05$). Earlier and recent studies proved that patients who underwent monitored anesthesia care with remifentanil had a higher rate of pregnancy than those with general anesthesia with propofol. It has been widely postulated that if the procedure lasts more than 12 minutes, then the pain is greater, also ideal anesthetic agent should be rapidly acting and rapidly recovered from [11,12].

Conclusion

Significant decrease in duration of operation in conscious group than that in general anesthesia group ($P=0.01$), Highly significant decrease in recovery time in conscious group than that in GA group ($P<0.001$).

No conflicts of interest
Source of funding: self
Ethical clearance: was approved by Iraqi Ministry of health- scientific committee

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