

Outcome of surgical sperm retrieval and ICSI in Iraqi azoospermic patients

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الخلاصة :- أجريت هذه الدراسة المستقبلية في مركز الخصوبة والعقم في مستشفى الصدر التعليمي في النجف الأشرف، وقد تكون الدراسة الأولى من نوعها التي تجري في العراق والتي تهدف إلى تقييم نسبة نجاح عمليات قطف الحيامن من البربخ والخصية لدى المرضى المصابين بالعقم بسبب انعدام النطف الكامل بنوعيه الأندادي و الأفرزي وكذلك تقييم نسبة نجاح عمليات التخصيب المجهري الأجياري باستخدام هذه الحيامن والتي تم سحبها وتجميدها. وقد شملت هذه الدراسة 146 مريض عراقي يعانون من العقم مع انعدام النطف الكامل وقد أجريت لهم جميعاً عمليات قطف الحيامن من البربخ أو الخصية وذلك باستخدام الطرق الجراحية المعتمدة وحسب الحالة المرضية ، وقد خلصت الدراسة الى نجاح عمليات قطف الحيامن بنسبة 100% لدى المرضى المصابين بانعدام النطف الأندادي و 45% لدى المرضى المصابين بانعدام النطف الأفرزي وهذه النسب مقارنة للنسب العالمية والموجودة في العديد من الدراسات المنشورة. اما نسبة التلقيح لدى المرضى الذين أجروا عمليات التلقيح المجهري خلال فترة الدراسة وذلك باستخدام هذه الحيامن والتي تم تجميدها والذين كان عددهم 40 مريضاً ، فقد كانت نسيه التلقيح 85% ، ونسبة إعادة الأجنة الى الرحم 75% ، ونسبة الحمل السريري لدى زوجات هؤلاء المرضى 23% .

Abstract:- Although ICSI technique represents the cornerstone in the management of infertility worldwide, this technique was only recently introduced to our country and this might be the first prospective study of its kind that done in Iraq which tries to evaluate the outcome of surgical sperm retrieval in azoospermic Iraqi patients using different methods of surgical sperm retrieval technique and to evaluate the pregnancy rate for those patients who tried ICSI.

Patients and methods:- This was a single center prospective study, which was performed at the reproductive and ICSI center, department of urology at AL-SADER MEDICAL CITY. The time of enrollment was from sixteenth of February to sixteenth of December 2011. A total of 146 azoospermic patients have been included in this study. Surgical methods which were used for sperm retrieval included PESA, TESA, simple TESE, open surgical epididymal sperm aspiration, open multiple TESE and Micro surgical TESE.

Results:- The aim of our treatment is to obtain and freeze sperm sufficient for at least two ICSI cycles. The total number of patients who had met the above criteria after surgical sperm retrieval (SSR) was 92 patients out of 146 patients included in the study. The overall success rate was 63%, this including 100% success rate in obstructive azoospermia and 45% success in NOA. For those patient who try ICSI at time of this study the fertilization rate was 85% , embryo transfer was done in 75% , and the pregnancy rate was 23%.

Conclusion:- Although the combination of surgical sperm retrieval (SSR) and ICSI may be the sole treatment available for male factor infertility with uncorrectable azoospermia, the overall success rate is limited particularly in NOA and ongoing pregnancies are obtained in <25% of ICSI cycles. However every azoospermic patients should offer such option of treatment and for those patients who had succeed sperm retrieval, multiple ICSI cycle trials may increase the chance of pregnancy without the need for repeated surgery. Open surgical methods of SSR, has been shown to increase the options available to the embryologist to use , select and cryopreserved sperms, however it will increase the surgical trauma to the testicles and increase the tissue extracted , the effects of these factors on the future testicular function needs to be investigated by further studies.

Introduction:-

Surgical management of male infertility has advanced significantly during the past 10 years. This improvement in operative intervention is due in part to advancements in assisted reproductive technologies and associated new sperm retrieval techniques, and a more scientific understanding of the effects of varicoceles on spermatogenesis as well as the introduction of innovative techniques in their surgical repair^(1,2,3). The advancement of assisted reproductive technologies, particularly the introduction of intracytoplasmic sperm injection (ICSI), has revolutionized the field of male infertility and now offers reproductive options to men who could not have initiated a pregnancy just 20 years ago. With the increased popularity and success of assisted reproductive techniques, there has been an increased demand for sperm retrieval procedures. For example, testis biopsy is no longer performed for diagnostic purposes alone but is also used as a therapeutic procedure for sperm retrieval and combined with in vitro fertilization (IVF) and ICSI^(4, 5, 6). Developments in open surgical approaches for sperm retrieval, such as microscopic testicular sperm extraction, have increased the options urologists now have for retrieval of sperm.⁽⁷⁾

Patients and methods:-

This was a single center prospective study, which was performed at the reproductive and ICSI center, department of urology at AL-SADER MEDICAL CITY. The time of enrollment was from sixteenth of February to sixteenth of December 2011. During this prospective study we try to avoid bias of patient's selection by including all azoospermic patients who attained the infertility center during this period of time

with no excluding criteria regardless of the testicular size and FSH level. A total of 146 azoospermic patients have been included, with an age ranged from 21 years to 49 years with a mean of 33 years. All patients had their seminal fluid been assessed by pellet test to confirm the diagnosis of azoospermia in addition to other investigation used in the evaluation of azoospermia including hormonal assessment and Doppler ultrasound of testicles. Surgical methods which were used for sperm retrieval including PESA, TESA, simple TESE, open surgical epididymal sperm aspiration (for small, non dilated epididymis) Open multiple (9) testicular sperm extraction for failed aspiration in obstructive cases and in all NOA cases. Micro surgical TESE with deep sperm extraction have been used in only three selected cases with bilateral small atrophied testicles and FSH of more than 50 mlu/ml

Results:-The characteristic of patients included in this study can be summarized in the table below

Table 1

Type of azospermia	No. of patients	Mean age	Duration of infertility
NOA	103	37	9.5
Obstructive azospermia	43	33	8.8

The aim of our treatment is to obtain and freeze sperm sufficient for at least two ICSI cycles. The results which were obtained from sperm retrieval and the outcome of ICSI for those patients who attempt fertilization can be summarized by the following tables.

Table 2 show the patients who had successful sperm retrieval

Total no. with +ve sperm retrieval	Obstructive	NOA
92	43	49

Table 3 show the patients who had failed sperm retrieval

Total no. with -ve sperm retrieval	Obstructive	NOA
54	ZERO	54

Table 4 show the success rate of sperm retrieval

The overall success rate	NOA	obstructive
63%	47%	100%

Table 5 show the surgical sperm retrieval (SSR) approach for obstructive azoospermia.

SSR approach	PESA	TESA	Open epididymal sperm aspiration	Simple TESE	Open multiple TESE	Micro TESE
No. of patients (Total no. 43)	28	No sufficient sperm for cryopreservation	8	4	3	Not used
Percentage	65%		18.6%	9.3	6.9%	

Table 5 show the outcome at ICSI

Total no. of azoospermic patients who have had ICSI	No. of cases which had 2 PN	No. of cases which had embryo transfer	pregnancy
40	34	30	9
	85%	75%	22.5%

Discussion:-

It was at 1677, a medical student Johan Ham , first who made the discovery of “animalcules” in human seminal fluid.⁽⁸⁾

For more than three hundred years man who had no sperm in the ejaculate regarded as sterile and had no any hope of fathering a child. It was until 1992, the

date that revolutionized the era of reproductive medicine by the Palermo G, who was the first who succeed in producing Pregnancies after intracytoplasmatic injection of single spermatozoon into an oocyte.⁽⁹⁾

Although ICSI technique represents the cornerstone in the management of infertility worldwide, this technique was only recently introduced to our country and this might be the first prospective study of its kind that done in Iraq which tries to evaluate the outcome of surgical sperm retrieval in azoospermic Iraqi patients using different methods of surgical sperm retrieval technique and to evaluate the fertilization rate and the pregnancy rate for those patients who tried ICSI during the time of this study. During this prospective study we try to avoid bias of patient's selection by including all azoospermic patients which attained our center successively and without excluding any patient whatever the size of the testicles and the FSH level.

In the present study all patients with presumed diagnosis of obstructive azoospermia have had successful sperm retrieval, with 100% success rate for this group of patients. The result obtained in the current study was similar to many other published studies.^{10, 11,12,13,14}

However, there was a great difference in the surgical methods which were used to retrieve sperm from this group of patients. The present study reflects more trends for open and more invasive methods of surgical sperm retrieval in this group of patients when compared to other studies. PESA was successful in only 71% in this study versus 83-96% in other studies.^{12, 13, 14}

This can be explained by the technical and administrative factors of the ICSI program which were adopted by our center to which we try to adhere. While most of these studies using fresh sperm ICSI program, which enable only very few number of sperm to complete the

ICSI cycle program, no fresh sperm ICSI have been used during this study, and all patient who have succeed sperm retrieval should have their sperm being cryopreserved before their female partners permitted to inter the ICSI program. Although such approach might decrease the number of the unnecessary or (pointless) ovarian stimulation and the overall cost of ICSI by excluding the wives of azoospermic patients who had failed sperm retrieval but it will put the urologist with more challenge to collect sufficient sperm that can met the criteria of cryopreservation which were determined by the embryologist request. Since assisted reproduction (IVF-ICSI) does not have a 100% success rate, it behooves reproductive urologists to develop and use sperm retrieval techniques that are not only reliable and of low morbidity, but that also have the potential to harvest sufficient sperm to enable multiple IVF-ICSI attempts without repeat surgery. The aim of our treatment is to obtain and freeze sperm sufficient for at least two ICSI cycles which will provide the azoospermic patient with a reasonable chance of paternity.

For patients with NOA, the present study reveal 45% success rate of surgical sperm retrieval. These results are consistent with the results reported by many published studies from different centers worldwide^{15, 16, 17} and it was within the standard expecting rate of sperm retrieval from this group of patients. However some studies present higher rate of sperm retrieval from NOA patients by using Micro TESE technique and they claim that this technique might increasing the sperm retrieval rate for up to 65% in patients with NOA^{18,19}. During this study, MICO TESE have been used for three selected cases with small sized atrophied testicles and markedly elevated FSH (more than 50 ng /ml) only one of these cases had

succeed sperm retrieval with positive results. However this procedure is time consuming and needs a high level of cooperation with the anesthetist and embryologist especially if both testicles need to be explored in which the time ranges from 2-4 hours.

During the time of this study, forty patients who have had succeed sperm retrieval, had attempt ICSI. The fertilization rate was 85%, the rate of embryo transfer was 75% however only 9 patients produce pregnancy and the pregnancy rate was (22.5%). The relatively low pregnancy rate in azoospermic patients at our center can mainly be attributed to the high mean of female age for azoospermic patients in comparison with non azoospermic patients 35 versus 29 and this can be clearly being shown by the disparity between the number of cases which had undergo embryo transfer and the number. of cases which got pregnancy. Possible genetic disorders might also contribute in NOA cases.

Conclusion:-

Although the combination of surgical sperm retrieval (SSR) and ICSI may be the sole treatment available for male factor infertility with uncorrectable azoospermia, the overall success rate is limited particularly in NOA and ongoing pregnancies are obtained in <25% of ICSI cycles. However every azoospermic patients should offer such option of treatment and for those patients who had succeed sperm retrieval, multiple ICSI cycle trials may increase the chance of pregnancy without the need for repeated surgery. Open surgical methods of SSR, has been shown to increase the options available to the embryologist to use , select and cryopreserved sperms, however it will increase the surgical trauma to the testicles and increase the tissue extracted , the effects of these factors on the future testicular function needs to be investigated by further studies.

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