

## RECOMMENDATION

1. In view of good correlation between embryo scoring and pregnancy outcomes routine use of embryo scoring is recommended.
2. Larger samples of patients with different inclusion criteria, using different scores are warranted to fully address this point.
3. Potential different modalities should be developed to transfer the least possible number of high quality embryos which will not affect ART outcome but avoid High order multiple pregnancy (HOMP).

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**STUDY OF THE EFFICACY OF A CUMULATIVE  
EMBRYO SCORING TECHNIQUE IN  
INTRACYTOPLASMIC SPERM INJECTION**

**دراسة فاعلية تقنية تصنيف الأجنة التراكمية فى الحقن المجهري**

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**الماجستير في التوليد و أمراض النساء**

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## INTRODUCTION

Since the introduction of assisted reproductive techniques (ART) in 1978, the transfer of several embryos in each cycle has been a common practice in order to overcome the consistently low conception rates.<sup>(1)</sup>

High order multiple pregnancies (HOMP), a major consequence of ART, has been of great concern in recent years due to its associated increase in perinatal mortality and morbidity.<sup>(2-4)</sup> Potential different modalities have been developed to decrease these complications. Among the most effective modalities used to avoid HOMP is to transfer the least possible number of high quality embryos which will not affect ART outcome.<sup>(5)</sup>

From 1986 many different embryo scoring methods have been described.<sup>(6-13)</sup> The main features considered in embryo scoring systems include cell number, blastomere size, shape, equality and degree of fragmentation.<sup>(19,20)</sup> These factors have been combined in numerous ways, often complex, to produce embryo scoring systems aiming at identifying embryos that would potentially result in a pregnancy.<sup>(21-24)</sup>

The first reports of embryo scoring<sup>(14)</sup> have concentrated on embryo growth rates with attention to its morphology. In 1987 Puissant et al.,<sup>(15)</sup> suggested that consideration of an embryo scoring system including cell number, blastomere size and shape, fragmentation degree is essential to identify high quality embryos that would lead to pregnancy. This idea was followed by Steer et al.<sup>(4)</sup> who proposed a mathematical scoring which is cumulative embryo score (CES), created by the summation of the individual scores of all embryos transferred. The score for each embryo in this method is the result of multiplication of the morphological

grade of the embryo by the number of blastomeres to produce a quality score for each embryo.<sup>(16.17)</sup>

Cumulative Embryo Score (CES) is clinically useful embryo scoring system, to reflect embryo developmental potential, which will enable the selection of the optimal number of embryos to transfer in order to achieve the maximum pregnancy rate with a low incidence of high order multiple pregnancies. Such scoring system, would have the definite practical advantages of being easily performed and interpreted with little room for inter-observer variation.<sup>(25.26)</sup>

## **AIM OF THE WORK**

This aim of this work is to study the use of a cumulative embryo score (CES) for the prediction of pregnancy outcome among cases undergoing intracytoplasmic sperm injection (ICSI). Our end point will be the occurrence of pregnancy ; detected by ultrasonography.

## **PATIENTS**

The study will include 100 patients admitted to El-shatby maternity university hospital of Alexandria.

### **Inclusion criteria:**

8. Age-Related Infertility
9. Male infertility
10. Cervical factor
11. Hormonal disturbances
  - Absent or Damaged Fallopian Tubes
  - Endometriosis
  - Unexplained Infertility
  - Recurrent Intrauterine Insemination Failure
  - Tubal and Pelvic Adhesions
  - Preimplantation Genetic Diagnosis (PGD)

### **Exclusion criteria:**

6. Poor responders.
7. Previous ICSI failure.
8. Uterine anomalies.
9. Age > 40
10. Recurrent pregnancy loss

## METHODS

- Written consent will be obtained from all patients to participate in the study.
- This study will be conducted on 100 patients with infertility
- All patients will be subjected to the following:
  1. Full history taking.
  2. Full clinical examination
  3. Controlled ovarian hyperstimulation following long agonist protocol using follicle stimulating hormone (FSH) & gonadotropin releasing hormone analogue.

Follicular growth will be monitored using serial vaginal ultrasound and serum estradiol levels.

4. Human chorionic gonadotropin (HCG) will be administered for final oocyte mature.
5. Oocytes will be retrieved transvaginally under ultrasound guidance.
6. Intracytoplasmic sperm injection will be done.
7. Fertilization will be examined 16-18 h after injection and embryo development will be evaluated on day 2 and 3 after injection.
8. The proposed embryo score is based on five criteria; the number of blastomeres or cells observed in relation to number of hours post-ICSI, the uniformity of cells in terms of size and shape, the clarity of the cytoplasm in terms of presence or absence of granulation, as well as the degree of anuclear fragmentation. The best embryos obtained a score of five, while the minimum cut-off score for embryos deemed suitable for transfer is three.

Table I. The five-point embryo scoring system

Features of the embryo	Yes	No
Is the embryo at a 4-cell stage at 44 hr, or a 6–8 cell stage at 68 hr, post-insemination?	1	0
Are all cells uniform in size?	1	0
Are all cells uniform in shape?	1	0
Is the cytoplasm of cells clear?	1	0
Are the anuclear fragments absent? If present, do they exceed 25%?	1 -1	0 0

9. Four embryos will be transferred according to the patient's age and embryo scoring.
10. Pregnancy will be confirmed by serum  $\beta$ -HCG measurement 16 days after and clinical pregnancy is defined as the presence of a gestational sac on ultrasound scan performed 2 weeks thereafter.

## RESULTS

The results of this study will be tabulated and analyzed with the use of appropriate statistical methods, figures and diagrams.

## DISCUSSION

The results will be discussed in view of achievement of the aim, their significance and their comparison with previous related researches.

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## الملخص العربي

على الأقل ربع الأزواج تواجه تأخيرات غير متوقعة في تحقيق حجم الأسرة المرغوب به. في السنوات الأخيرة، كان هناك تقدم في تقنيات الطب الإنجابية التي ساعدت في خفض كل من خجل العقم وإحجام الأزواج لطلب المشورة. وقد أدى استمرار التقدم في مجال الطب التناسلي في ارتفاع معدلات الحمل، التي وفرت أيضا دافعا إضافيا لخفض عدد الأجنة المنقولة دون التأثير على معدلات الحمل.

الحقن المجهر بلديه القدرة على تحقيق أعلى معدلات الإخصاب والحمل بغض النظر عن خصائص الحيوانات المنوية مما يجعلها الأقوى لعلاج العقم.

أساليب غير التداخلية على الجنين تساعد في تقييم الأجنة من دون ضرر. وقد وصفت العديد من الأساليب المختلفة تقييم الجنين. الملامح الرئيسية في أنظمة تقييم الجنين تشمل: عدد البلاستومير، وحجم بلاستومير، والشكل، والمساواة، والمظهر من السيتوبلازم ودرجة تجزئة او الحبيبات. وقد تم الجمع بين هذه العوامل بطرق عديدة معقدة، لإنتاج أنظمة تقييم الجنين بهدف تحديد الأجنة التي من شأنها أن تؤدي إلى الحمل. التقييم المثالي للأجنة في اليوم 3 يكون حوالي ثمانية من بلاستوميرز التي تتماثل في حجمها وشكلها، وينبغي أن يكون السيتوبلازم خالي وواضح مع بعض التحبيب، ويجب أن تكون تجزئة أقل من 20%.

تصنيف الأجنة التراكمي (CES) هو أداة مفيدة عمليا و يعكس الإمكانيات التنموية للجنين، مما يمكن اختيار العدد الأمثل من الأجنة لنقل من أجل تحقيق أقصى معدل الحمل مع أدنى معدل ممكن من حالات الحمل المتعددة. ومن شأن هذا النظام ان لديه مزايا عملية محددة يسهل تفسيرها و يتم تنفيذه بسهولة.

وكان الهدف من هذا العمل دراسة نظام تصنيف الاجنة التراكمي (CES) للتنبؤ بنتائج الحمل بين حالات الحقن المجهري.

أظهرت نتائج هذه الدراسة ما يلي: كان عدد البلاستوميرز أقوى مؤشر لحيوية الجنين ونتيجة الحمل. إذا اتخذت بعض العلامات الشكلية الأخرى مفردة مثل حجم بلاستوميرز، والشكل، سيتوبلازم والتجزئة فهي غير كافية للتنبؤ بالحمل.

وكان متوسط تقييم الأجنة في الحوامل 4، وكان الحد الأدنى 3، في حين كانت الدرجة القصوى 5.

أظهر هذا النظام حساسية 87% وخصوصية 100% في تصنيف بين الحوامل وغير الحوامل مع النقطة الفاصلة 3.5 في الختام، تصنيف الأجنة التراكمي سهل التطبيق، أداة تشخيصية جيدة وفعالة للحد من حالات الحمل المتعدد.

# دراسة فاعلية تقنية تصنيف الأجنة التراكمية فى الحقن المجهري

رسالة

مقدمة الى كلية الطب – جامعة الإسكندرية

إيفاءً جزئياً لشروط الحصول على درجة

الماجستير فى التوليد و أمراض النساء

مقدمة من

**أميرة سيد أحمد محمد يوسف**

بكالوريوس الطب والجراحة ، جامعة الإسكندرية

2015

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موافقون

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