Evaluation of the Usefulness of a Sperm Preparation Device Utilizing Two Types of Membrane Structures in IUI

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Background and Objective

Sperm preparation devices utilizing membrane structures separate motile sperm with high linear velocity by allowing them to pass through a microporous membrane, effectively eliminating sperm with abnormal morphology. Compared to the conventional density gradient centrifugation (DGC) method, this approach can select sperm with higher motility and less DNA damage. However, its clinical usefulness in intrauterine insemination (IUI) has not been demonstrated. In this study, we used two types of devices for sperm preparation in IUI and performed comparative analyses of post-preparation sperm characteristics and clinical outcomes.

Conflict of Interest Disclosure

Presenter's Name: Ayane Takemura
Affiliation: Reproduction Clinic Osaka

I have no conflicts of interest to disclose regarding the topic of this presentation.

Subjects and Methods

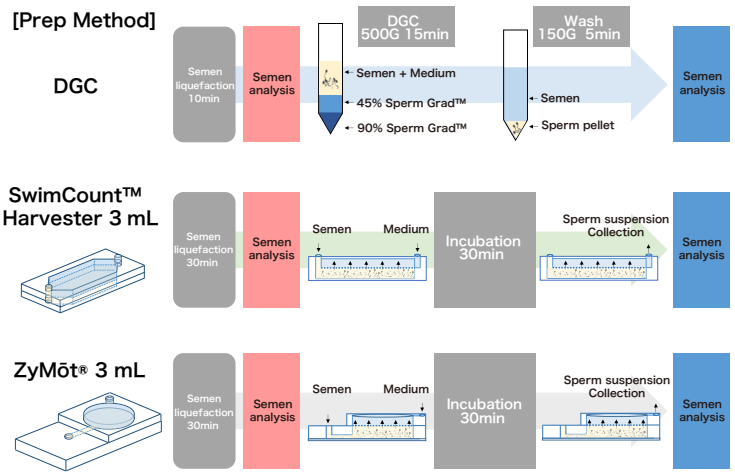
[Subjects] From January 2024 to September 2024, 90 cases meeting the following criteria were selected from patients who underwent IUI at our clinic:

Female age: under 35 years, Semen volume: ≥ 1 .4 mL
Total motile sperm count: ≥ 1 0 Million/3 mL
Patients who have not undergone ART, and this was either their first or 2nd IUI

The cases were divided into three groups:
DGC method: 30 cases
SwimCount™ Harvester 3 mL (MotilityCount): 30 cases
ZyMōt® 3 mL (DxNow): 30 cases

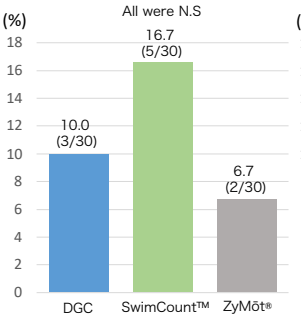
	DGC	SwimCount™	ZyMōt®	P-Value
Femal age (avg±SD)	30.0±3.0	31.1±2.0	31.1±2.0	N.S.
Volume, mL(avg±SD)	3.6±1.7	3.1±1.0	2.9±1.0	N.S.
Total motile sperm x10⁶(avg±SD)	93.4±97.8	141.1±146.7	78.4±69.1	N.S.

[Prep Method]



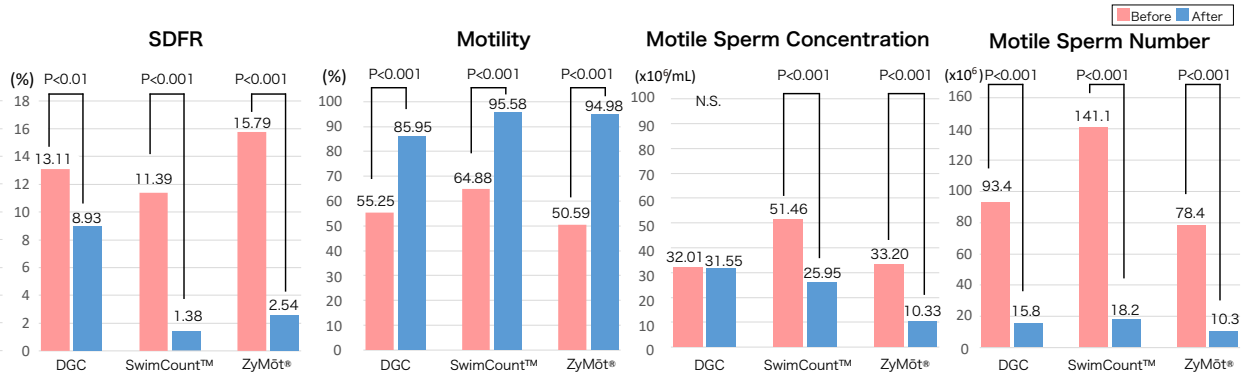
Result

[Clinical result]



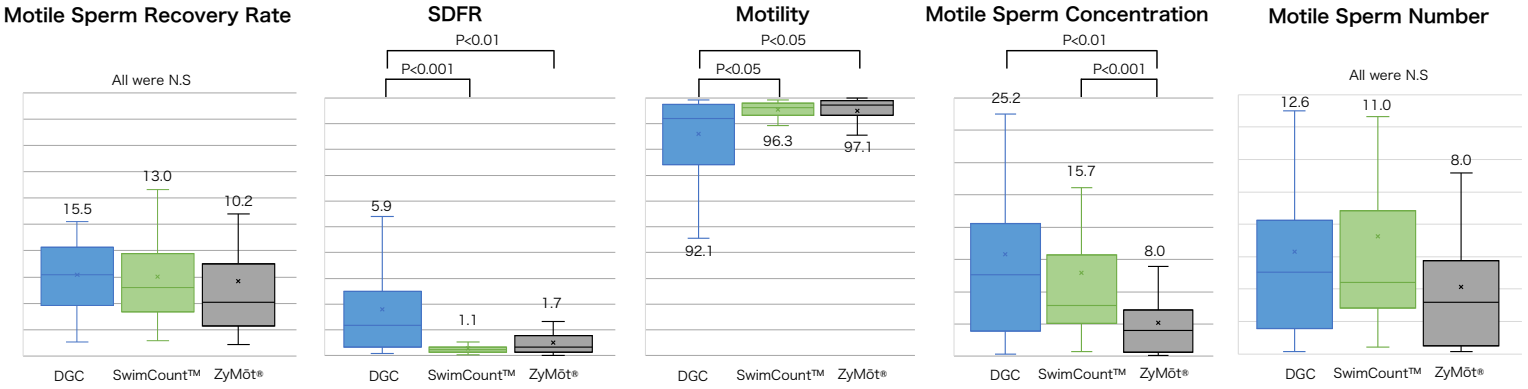
(Chi-Square Test)

[Comparison of Sperm Characteristics Before and After Preparation]



(t-test for normal distribution, Wilcoxon signed-rank test for non-normal distribution)

[Comparison of Sperm Characteristics Among Groups After Preparation]



(Kruskal-Wallis test for differences among the three groups; if significant, Steel-Dwass test)

Conclusion

The SDFR and Motility after preparation with the SwimCount™ Harvester and ZyMōt® were superior to those achieved with the DGC method. The SwimCount™ Harvester demonstrated a motile sperm recovery rate comparable to DGC and outperformed ZyMōt® in terms of motile sperm recovery rate and motile sperm concentration. Furthermore, the preparation methods of the SwimCount™ Harvester and ZyMōt® were simpler and required fewer steps compared to DGC, allowing for other laboratory tasks to be performed during the 30-minute incubation period. Given its favorable sperm characteristics after preparation and ease of use, the SwimCount™ Harvester 3 mL was considered an effective option for sperm preparation in IUI.

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The original text of this poster is in Japanese, and the English translation was provided by MedTech Partners KK, the exclusive distributor of MotilityCount in Japan.

IUIにおける2種の膜構造を用いた精子調整用デバイスの有用性の検討

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背景・目的

膜構造を利用した精子調整用デバイスは微小孔の空いた膜を通過させることを利用して、形態の大きな精子を除いた高速直線運動精子を分離する調整方法である。従来法の密度勾配遠心(DGC)法と比較してDNA損傷が少なく運動性の高い精子を選別し得るが、IUIにおける有用性は示されていない。本検討ではIUI用の精子調整に2種のデバイスを用いて、調整後精子所見および臨床成績を比較解析した。

利益相反状態の開示
筆頭演者氏名：武村 采音
所属：リプロダクションクリニック大阪
私の今回の演題に関して、
開示すべき利益相反状態はありません。

対象・方法

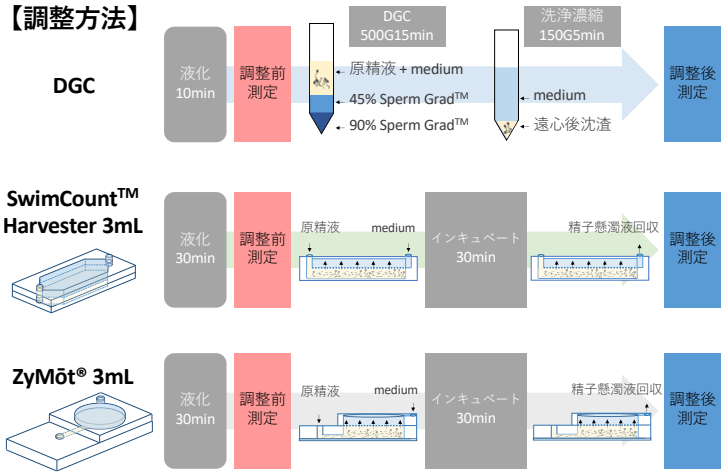
【対象】2024年1月～2024年9月に当院でIUIを実施
以下の条件を満たしている90症例
・妻年齢35歳未満　・精液量1.4mL以上
・総運動精子数1000万個/3mL以上
・ARTを行っておらず、IUI初回もしくは2回目

DGC法： 30症例
SwimCount™ Harvester 3mL (MotilityCount社)：30症例
ZyMōt®3mL (DxNow社)： 30症例

	DGC	SwimCount™	ZyMot®	P Value
妻年齢(avg±SD)	30.0±3.0	31.1±2.0	31.2±2.1	N.S.
液量(mL)(avg±SD)	3.6±1.7	3.1±1.0	2.9±1.0	N.S.
総運動精子数 (×10⁶)(avg±SD)	93.4±97.8	141.1±146.7	78.4±69.1	N.S.

【測定】一般精液検査 : 精子運動解析装置(SMAS: Ditect社)
精子DNA損傷率(SDFR) :フローサイトメーター(BECKMAN COULTER社)

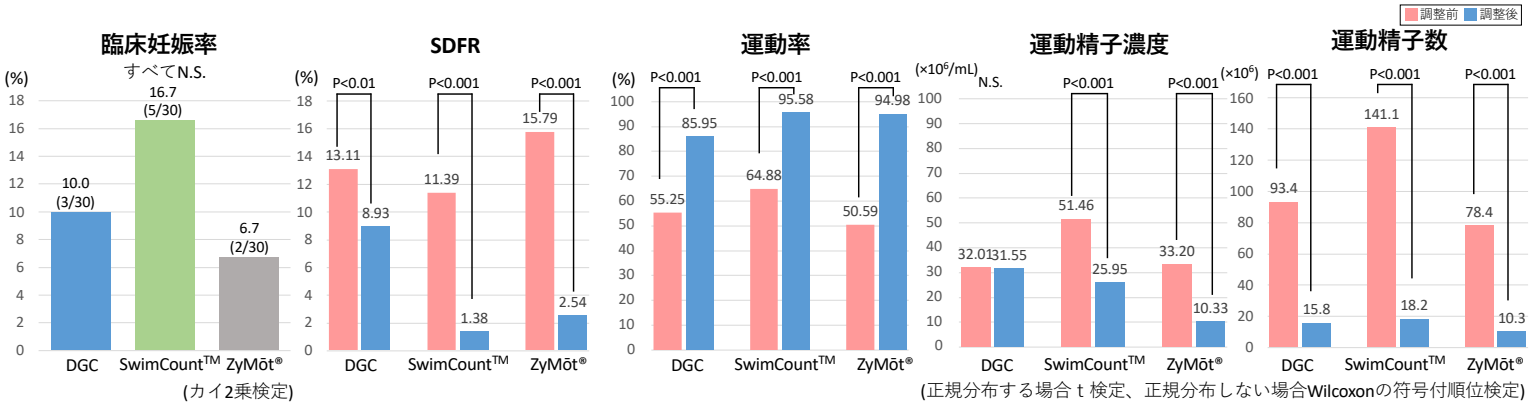
【調整方法】



結果

【臨床成績】

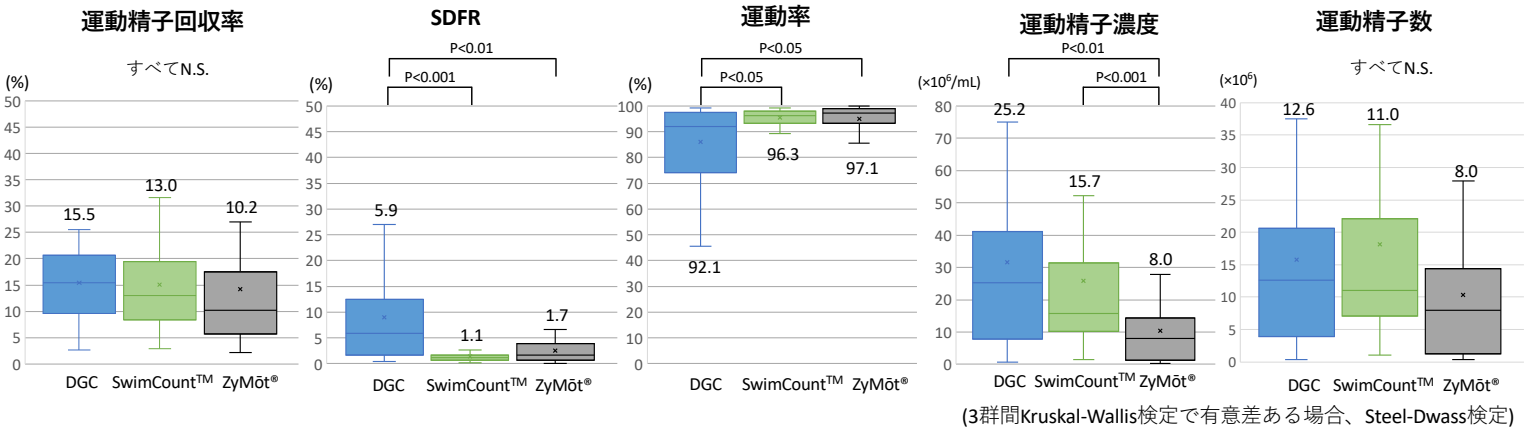
【調整前後精子所見の比較】



(カイ2乗検定)

(正規分布する場合ｔ検定、正規分布しない場合Wilcoxonの符号付順位検定)

【調整後各群精子所見の比較】



(3群間Kruskal-Wallis検定で有意差ある場合、Steel-Dwass検定)

結語

HarvesterとZyMōt®の調整後のSDFR、運動率はDGC法より良好であった。HarvesterはDGC法と運動精子回収率が同等で、ZyMōt®と比較して、運動精子回収率、運動精子濃度が良好であった。また、調整方法において、 HarvesterとZyMōt®は、DGCと比較して作業工程が少なく簡便であり、さらに、30分間のインキュベートの間に他のラボワークを行うことが可能である。
Harvester 3mLは、調整後精子所見が良好で、調整方法も簡便であるため、IUI用の精子調整の有効な選択肢となると考えられた。

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