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MORPHOLOGICAL ABNORMALITIES OF THE SPERM IN THE CLINICAL CYTOLOGY LABORATORY OF COCODY-ABIDJAN TEACHING HOSPITAL

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ABSTRACT
Introduction: Male infertility is a multifactorial pathology and the spermocytogram remains the essential examination in its exploration. **Goal**: This study aimed to determine the predominance of sperm morphological abnormalities. **Materials and methods**: The study material consists of the register of cytospermogram examination results and histological preparations (slides) stained with May-Grunwald Giemsa (MGG). The results of 69 patients were analyzed with the XLSTAT 2014 software version 5.03. Photomicrographs were taken using an optical microscope equipped with Motic Images plus 2.0 software. **Results:** The sperm morphological abnormalities observed during the study period were characterized by a predominance of midpiece abnormalities followed by those of the head and flagellum. The Kruskal-Walli test showed a highly significant difference at $p = 0.0001$ ($p < 0.05$) of the malformations of the sperm intermediate part with a predominance of angulations (51.16%). **Conclusion:** This study revealed the predominance of angulations among the morphological abnormalities of the spermatozoa. These observations could be supplemented by an etiological study.

KEYWORDS: spermocytogram, sperm, abnormality, morphology.

INTRODUCTION
Male infertility is a multifactorial abnormaly (physiology, physical, exogenous and genetic). [Colaco and Modi, 2018 ; Harton and Tempest, 2012 ; Traoré, 2010]

The spermocytogram is an examination that can screen for morphological abnormalities of the sperm and assess the percentage of normal forms. It represents the essential examination in the exploration of male infertility. [Ahadi et al (2019), Garriguet and Collet (2014), Quevauvilliers and Fingerhut (2009)]

Previous work made by Kouacou (2012) and Saï (2017) determined morphological abnormalities of the spermatozoon at the level of the head, the intermediate piece and the flagellum without however comparing them to each other. Also, the literature provides very little information on this problem.

This study therefore aims to evaluate and determine the predominance of morphological atypies of spermatozoa during spermocytogram examinations at the Laboratory of Histology, Embryology, Cytogenetics and Molecular Biology of the Abidjan-Cocody Teaching Hospital (RCI).

I. MATERIALS AND METHODS
1. Study framework
1.1. Location
Study was conducted at Laboratory of Histology, Embryology, Cytogenetics and Molecular Biology of the Teaching Hospital of COCODY-ABIDJAN.

1.2. Type and duration of the study
Retrospective study that took place over the period from March 2017 to October 2019.

2. Materials
2.1 Study Material
The study material consists of the register for recording the results of the spermocytogram according to modified David's criteria.

2.2 Data entry and statistical analysis equipment
It consists of a computer (LENOVO, Intel Ideapad 120S-11 / AP) equipped with Microsofot Word 2010, Excel 2010 and XL Stat 2014 version 5.03 software.

3. Methods
3.1 Sampling
We considered a number of 69 spermocytogram results out of 77 examinations performed over the study period

according to WHO (2010) and Biofarma classification (2009). So the "all-comers" were considered at the start (n = 77). However, after analysis of the results only 69 results composed of normal spermocytograms (n = 16) and subjects with teratozoospermia (n = 53) were retained. Azoospermic subjects were not included in our work for lack of usable data because very often suffering from severe azoospermia. Thus, we only used data relating to the morphology of the sperm.

3.2 Statistical analysis

The entry and processing were carried out with Microsoft Word 2010. The tables and figures were produced with the Microsoft Excel 2010 spreadsheet. The XLSTAT 2014 version 5.03 software enabled the statistical analysis of the data using Levene's tests (parametric test) and Kruskal-Wallis (nonparametric test) at the significant threshold of 5%.

RESULTS

1- Comparative analysis of morphological abnormalities of the sperm

We observed several types of morphological abnormalities of the sperm which can be grouped into three groups:

- Abnormalities of the sperm head,
- Anomalies of the intermediate part,
- Flagellum abnormalities.

The Kruskal-Walli test showed a highly significant difference at p = 0.0001 (p <0.05) in the morphological abnormalities of the sperm. Anomalies of the intermediate piece are dominant with a high rate of angulation of the middle piece (51.16%) followed by those of the head and flagellum (Fig. 1).

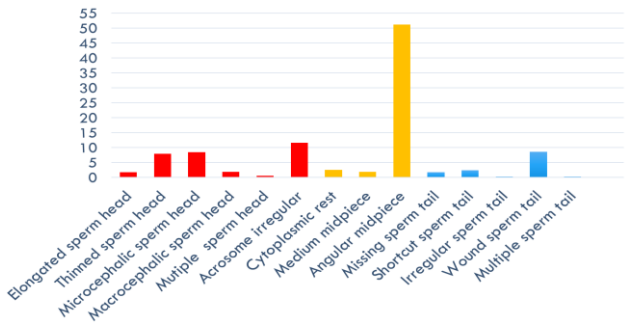

Fig.1: Repartition of morophoplogical sperm abnormalities.

2- Variations in anomalies of the sperm head

The Kruskal-Walli test showed a highly significant difference at p = 0.0001 (p <0.05) in abnormalities of the sperm head with a high percentage of irregular acrosomes (36.3%) followed by microcephaly (26, 20%) and thinning of the head (24, 63%). The other abnormalities (macrocephaly and elongated head) are below 5% and the lowest rate is obtained in multiple abnormalities of the head (Fig. 2).

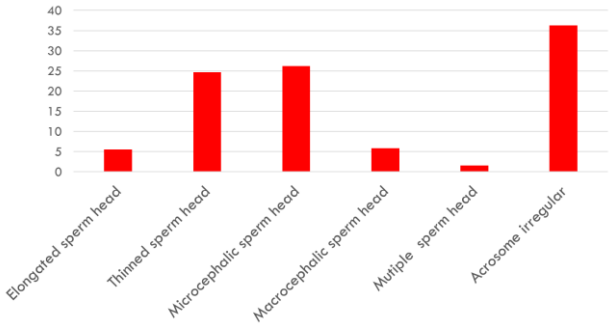

Fig. 2: Variation of diffrent sperm head abnormilities.

3- Variations of abnormalities of the intermediate part of the sperm

At this level, we obtained using the Levene test a significant difference p = 0.032 (p <0.05) of the variations of the abnormalities of the intermediate part. Angulations were the most dominant (92%) (Fig. 3).

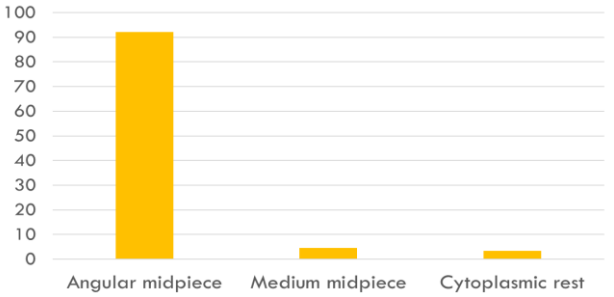

Fig.3: Variation of diffrent sperm midpiece abnormalities.

4- Variations in abnormalities of the sperm flagellum

The Kruskal-Walli test showed a highly significant difference at p = 0.0001 (p <0.05) in the abnormalities of the sperm flagellum with a significant rate (79.46%) of the absence of the flagellum.

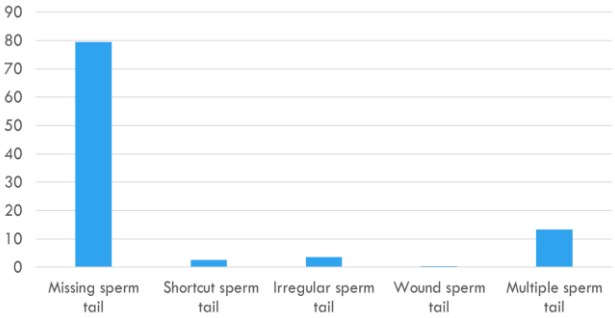

Fig. 4: Variation of diffrent sperm tail abnormalities.

DISCUSSION

This work was carried out on the basis of the results of spermocytograms. We chose a subjective method (analysis of reports). This method limited us in taking into account the physical status and socio-cultural factors of the subjects for a more objective analysis of the morphological abnormalities of the sperm observed.

We grouped the morphological abnormalities of the sperm into three[3] groups (head, intermediate part, flagellum) such as Konaté (2009), Kouacou (2012) and Saï (2017). Statistical analysis of the frequencies of these abnormalities showed a significant difference p = 0.0001 (p <0.05). Angulation was the dominant morphological abnormality over the sperm cytological abnormalities found in this study. No such comparison has been made previously according to the literature.

This analysis revealed a highly significant difference at p = 0.0001 (p <0.05) in sperm head abnormalities with a high percentage of irregular acrosomes (36.3%) followed by microcephaly (26.20%) and head thinning (24.63%). The dominance of irregular acrosomes at the level of head anomalies has also been observed by Gebreegzaibher et al (2004) on sedentary subjects. Saï (2017) obtained a dominance of the "microcephalic" form in sedentary people and "thinned" form in active people.

These abnormalities of the sperm head are responsible for poor penetration into the oocyte.

As Konaté (2009), Kouacou (2012) and Saï (2017), we obtained a predominance (92%) of the angulation of the intermediate piece with a significant difference p = 0.032 (p <0.05). These values are different from those obtained by Zeghib (2009) who obtained a predominance of cytoplasmic remains.

We obtained a predominance of the absence of flagella at 79.46% contrary to the observations made by Konaté (2009), Zeghib (2009), Kouacou (2012) and Saï (2017). This would be justified by the fact that our study population consists of people who are apparently infertile. The flagellum ensures the mobility of the spermatozoon towards the oocyte, its absence indicates a significant asthenozoospermia.

CONCLUSION

This retrospective study allowed us to assess and classify the malformations observed in several regions of the sperm, namely the head, the middle part and the flagellum. Statistical analysis showed a dominance of angulations over all the different anomalies enumerated with highly significant differences. These results corroborate those already achieved by other authors on sub-Saharan African subjects. Thus, it would be interesting to continue this work in order to determine the causes of angulation of the intermediate part of the spermatozoon because the molecular and cellular mechanisms of flagellar growth are still very little known.

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