



The utility of Hystero-Embryoscopy in cases of miscarriage till 10 weeks

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ABSTRACT

Spontaneous abortion occurs in 10-15% of all pregnancies. It has emotional implications for the patients due to the unknown etiology. Ultrasound is very limited in the diagnosis of malformations in cases of a missed abortion of less than 11 weeks. In our center we offer the option of performing a Hystero-Embryoscopy in cases of miscarriage till 10 weeks. We assess the embryo for external malformations and offer the patients to perform a non-contaminated biopsy for genetic study of the embryo. We also look for the implantation site of the gestational sac and aspiration is focused only on the implantation site without touching other walls. By this, we reduce the risk of posterior adhesions. Finally, after the aspiration, we assess again the implantation wall for any remaining products of conception (RPCO). 100% of our patients go home without any RPOC avoiding a second procedure.

Key words: Hysteroscopy, Hystero-embryoscopy, Embryoscopy, Missed abortion, Miscarriage.

INTRODUCTION

Spontaneous abortions occur in approximately 10–15% of all pregnancies and can be caused by different factors, such as immunologic, anatomical, endocrine, infectious, metabolic, hematologic, and even chromosomal abnormalities.^[1] In cases of recurrent miscarriages, a study must be started to seek for the etiology. In approximately 50% of all miscarriages there is chromosomal abnormality. It is important to obtain a fetal tissue sample not contaminated with maternal tissue to get a diagnosis of a chromosomal abnormality and by this we can potentially help with future pregnancy planning.^[2]

Transcervical hystero-embryoscopy is the technique of introducing a hysteroscope into the uterine cavity to identify and enter the gestational sac enabling visualization of the fetus through the amnion. This technique was first described by Bjorn Westin in 1954. We used to perform a hysteroscopic

visualization in cases of fetuses for diagnosis of fetal anomalies before termination in the second trimester using a 10-mm panendoscope.^[3]

More recently, however, transcervical hystero-embryoscopy has been incorporated in cases of first trimester missed abortion to assess externally the embryo. External macroscopic anomalies can be spotted that sometimes can give an explanation regarding a developmental reason for the pregnancy loss. It also allows us to perform a direct biopsy of the embryo and to extract not contaminated tissue for the chromosomal analysis.

SURGICAL TECHNIQUE

Suction curettage is performed by placing a suction curette inside the uterus evacuating the intrauterine contents through an aspiration pump. The suction curette is detached from the suction tubing attached to a suction canister to obtain the tissue from the curette under sterile technique before the tissue is collected within the suction canister. This allows for careful separation of the decidual tissue from the chorionic villi.

In our center, when a miscarriage is diagnosed by ultrasound scan, we offer the patient the option of performing a hystero-embryoscopy with suction curettage as an alternative to medical evacuation of the uterus. This technique is offered in case of

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miscarriage until the 10th weeks of pregnancy based on the ultrasound CRL.

The advantages for the patient are:

1. Assessment of the embryo for any malformation
2. The option of performing a biopsy from the embryo and perform a chromosomal study
3. We look where the location of the implantation is, then when suction curettage is performed, we only focus in the implantation wall without touching the other uterine wall
4. When suction curettage is finished, we enter the cavity again with the hysteroscope to check that no remaining products of conception were left in inside.

The procedure is performed with a 5 mm outer diameter, continuous flow, 30° hysteroscope with an operative channels and a fluid pump for normal saline. The intrauterine pressures are maintained at 80 mmHg to enable visualization of the gestational sac and fetus while clearing blood and debris.

Using a 5Fr grasper forceps or scissors, we open the chorion and enter the gestational sac. Once inside we wash to clear the image and look for the amniotic sac. We check for the yolk sac and again with a 5Fr tool, we open the amnion. Once inside the amnion, we look for the embryo.

It is important to be systematic and assess the limbs, face, head, chest, and abdomen with the cord insertion, genitalia, and the back. Everything is recorded and documented. Later, we check the video slowly to be sure that no malformation escaped to our eye.

If tissue for the embryo is needed, then with the grasper forceps we can remove the embryo or a part of it.

The hysteroscope is then withdrawn and suction curettage performed. The hysteroscope is then replaced to look for any retained products of conception (RPOC) that can be removed before termination of the procedure.

In our center, we have been performing this technique for the past 3 years.

Based on 67 cases, we found external malformations in almost 57% of the embryos, mostly in face and head. About 100% of the patients went home with no RPOC.

In the images 1 to 5, we bring some of the findings.



Figure 1: 10 weeks embryo with polydactyly

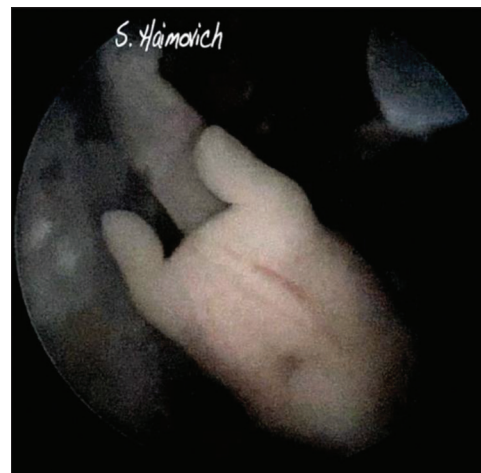


Figure 2: 9 weeks embryo with spina bifida

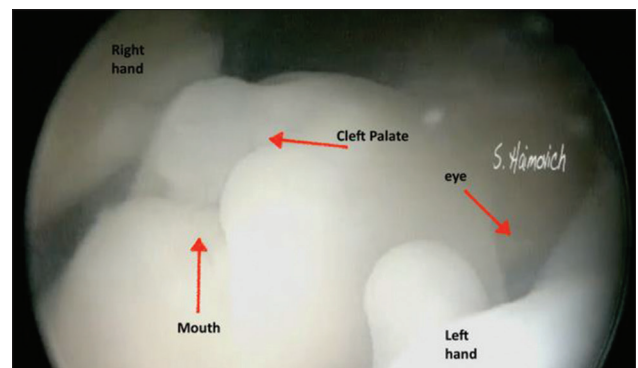


Figure 3: Cleft Palate in a 9 weeks embryo

DISCUSSION

Fetal karyotyping is important for those women experiencing recurrent miscarriage to allow for appropriate genetic counseling before pursuing a future pregnancy. This counseling, in cases like the Spina Bifida can be performed without the genetic study of the embryo.

Conventionally, missed abortions treated with surgery are done with suction curettage. The curettage specimen, however, is combined with maternal tissue leading to possible false positive results of normal female karyotype.

The integration of hysteroscopy to assess causes of pregnancy loss, allows the direct visualization of the uterine cavity, the gestational sac, and the embryo. This technique is known as hystero-embryoscopy or embryofetoscopy.^[1,3-11]

The importance of the morphological analysis of the embryo by direct before suction curettage was proven by Phillip *et al.* In his series, he achieved a successful visualization of the embryo in 233 cases. Only 33 had normal features and 18% had a morphologic defect despite a normal karyotype. He concluded showing the value for both morphologic analysis and karyotyping.^[8]

Ferro *et al.* published a series of 68 women that underwent a hysteroscopy with a biopsy from the chorion and amnion before the suction curettage. They compared the chorionic villi from the

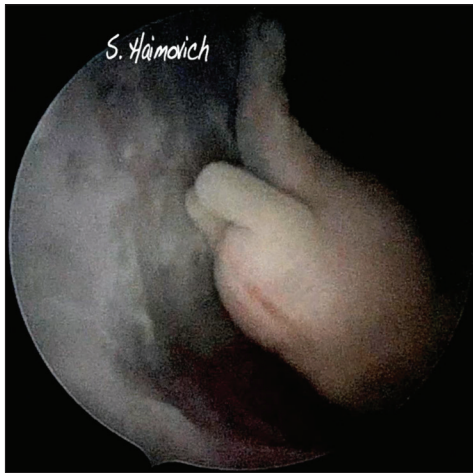


Figure 4: Lateral view of a 9 weeks embryo with spina bifida

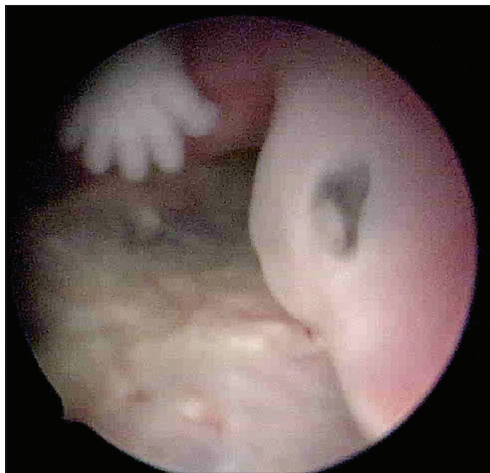


Figure 5: Polydactyly of a 9 weeks embryo

urettage material with the material obtained by a direct biopsy performed during the hysteroscopy. Total contamination with maternal tissue was found in 22.2% of patients with a subsequent possible genetic misdiagnosis, something that did not happen in the cases of a fetal biopsy under direct vision. The authors concluded that direct biopsies were reliable and suitable for analyzing full karyotype.^[9]

Another author, Robberecht *et al.* published a series of fifty-one women that underwent operative hysteroscopy for not only direct biopsies of the chorionic villi and/or embryo but also for morphologic analysis of the embryo. Chromosomes were detected through microarray analysis. Thorough morphologic investigation was not possible in eight cases, but the authors noted that approximately 50% of the embryos appeared normal. It was concluded from this study that the strength of embryoscopy is the ability to directly biopsy products of conception with fetal origin to reduce maternal contamination.^[11]

In 2010, Awonuga *et al.* published a study that also compared suction curettage with hysteroscopic biopsy. Their results did not show an increase in the sensitivity of conventional cytogenetics for detecting aneuploidy. The limitation of this study is the small number of cases. Of the 35 women evaluated, 25 underwent suction curettage, and ten underwent hysteroscopic biopsy followed by suction curettage.

We are facing a relatively new field and more and larger studies are needed.

CONCLUSION

The first question that any couple asks after a miscarriage is “Why?” In many cases, the woman analyzes her actions to see if something she did or did not could have caused this loss. The hystero-embryoscopy in many cases helps by giving a direct answer after finding an external malformation but also by performing a chromosomal study with a direct non contaminated biopsy of the embryo.

Based on the published literature, early pregnancy should be evaluated with hystero-embryoscopy and a direct biopsy of the chorionic villi and/or fetus prior to suction curettage, should be performed, to lower maternal cell contamination with fetal karyotyping. There is also the additional benefit of fetal anatomical assessment that can also be informative when trying to understand the cause of pregnancy loss.

It seems that the hystero-embryoscopy will add accurate information to explain and reduce the risk of future miscarriages, by giving both genetical and morphological information on the embryo.

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