Reproductive Outcomes in Women with Uterine Anomalies


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Abstract

Objective: To determine the effect of uterine anomalies in the pregnant outcome in assistant reproductive treatment.

Material and Methods: Retrospective study in Mohamed Fares centre and Mohamed Abdou centre between December 2005 and January 2008 to calculate the incidence of pregnancy rate in patients who have uterine abnormalities. Twenty three patients had different uterine abnormality undergone 31 ICSI cycle and incidence of clinical pregnancy, incidence of implantation rate and Miscarriage rate and home-taking baby rate.

Results: This study looked at 23 subjects who underwent 31 IVF cycles [1]. Using their own historical data, we found that overall clinical pregnancy (37.3% in uterine malformations Vs. 38.8% in controls) and implantation rates (17.5% in uterine malformations Vs. 13.0% in controls) were similar.

Conclusion: Uterine anomalies have an effect in pregnant outcome in ART whoever it is small study. In general, the role of IVF needs to be better evaluated, with studies including a larger number of subjects. IVF pregnancy rates appear to be decreased not because of decreased number or quality of eggs obtained but rather because of the uterine anomaly itself.

Key Words: Uterine outcomes in women – Uterine anomalies – ART.

Introduction

In general, uterine anomalies present some difficulty in pregnancy retention and overall pregnancy outcome with natural conception and ART.

Arcuate uterus probably has no impact on reproductive capacity. The uterine septum is more definitively associated with recurrent miscarriage and unlike the bicornuate uterus, surgical correction is technically easier and less morbid. Therefore, in the face of suspect data, surgical repair for the infertile couple with no previous pregnancies seems reasonable. The bicornuate uterus appears to cause an increased miscarriage rate and preterm delivery [1].

The didelphic uterus was originally thought to have no impact on reproductive outcome, but reevaluation of the literature shows that it does increase preterm deliveries and miscarriage rates. Like the unicornuate uterus, the didelphic uterus has an increased risk of malpresentation and cesarean section for dystokia. Patients with a unicornuate uterus have the poorest outcome: Higher miscarriage rates, higher ectopic rates, higher preterm delivery rates and lower live birth rates. Pregnancy for vaginal agenesis patients appears comparable with oocyte retrieval from the affected patient and IVF and embryo transfer into a gestational carrier. DES-exposed patients have increased miscarriage, ectopic pregnancies and preterm delivery rates because of the multitude of associated genital anomalies, not only uterine [2,3].

In general, the role of IVF needs to be better evaluated, with studies including a larger number of subjects. IVF pregnancy rates appear to be decreased not because of decreased number or quality of eggs obtained but rather because of the uterine anomaly itself. Resulting implantation rates and clinical pregnancy rates are still uncertain but may be reduced by 50% compared with women undergoing IVF without anomalies. Uterine anomalies present some difficulty in pregnancy retention and overall pregnancy outcome with natural conception and ART [3].

The impact of a uterine septum on infertility is less clear. The diagnosis is usually found on a HSG during the standard infertility evaluation. Differentiation between the uterine septum and the bicornuate uterus cannot be made definitively with the HSG alone. Further evaluation of the fundal contour must be done with laparoscopy, MRI, or US because therapy is very different.

The incidence of both complete and partial uterine septi is 33.6% and it is the most common
uterine abnormality [1,4]. Therapy originally involved wedge resection of the uterine septum, but because of improved surgical equipment and better optics, hysteroscopic resection is fairly routine and technically simple to perform. It is, in fact, an incision rather than an excision of the septum. Pregnancy outcome has been shown to significantly improve.

Poor pregnancy outcome is believed, in theory, to be due to the septum’s poor implantation environment. The septum provides a scanty vascular supply for the implanting embryo because of disruption by the septum of orderly arranged vessels in the intermediate myometrial layer of the uterus [2].

Because of its technical simplicity and significant impact on improving reproductive capacity, I advocate surgical removal of the uterine septum, especially in women diagnosed with recurrent pregnancy losses. Resection may also be considered in infertile couples where no other obvious etiology is apparent.

The incidence of bicornuate uterus has historically been the most frequent, although, as stated before, uterine septi and arcuate uteri appear to be the most common [1]. Again, the current literature is limited on the reproductive outcome of bicornuate uterus.

Surgical reconstruction for the bicornuate uterus can be considered for patients with recurrent miscarriages and no other obvious etiologies although data on improved pregnancy maintenance are limited. In general, live birth rates improve in a selected population from 2%-21% to 60%-86%. Nevertheless, if surgical correction of a bicornuate uterus for pregnancy maintenance is elected, a Strassman metroplasty is performed [3]. This technique involves a transverse fundal incision into the separated uterine cavity and subsequent reconstruction in a layered closure of a vertical incision similar to the closure of a classic incision during a cesarean section. No data exist advocating surgical correction for infertility indications and this is not recommended.

Overall, data are limited in the reproductive outcome of uterine anomalies undergoing IVF because of the relative infrequency of such uterine anomalies. However, this situation may change in the near future as access to ART and IVF pregnancy rates improves.

**Material and Methods**

Retrospective study in Mohamed Fares centre and Mohamed Abdou centre between decembe 2005 and January 2008 to calculate the incidence of pregnancy rate in patients who have uterine abnormalities. Twenty three patients had different uterine abnormality undergone 31 ICSI cycle and incidence of clinical pregnancy, incidence of implantation rate and Miscarriage rate and home-taking baby rate.

**Results**

This study looked at 23 subjects who underwent 31 IVF cycles [1]. Using their own historical data, we found that overall clinical pregnancy (37.3% in uterine malformations Vs. 38.8% in controls) and implantation rates (17.5% in uterine malformations Vs. 13.0% in controls) were similar. Subjects with a bicornuate uterus had a 47.3% implantation rate (IR), those with a septate uterus had a 22.5% IR, those with a bicornuate uterus had an 11.6% IR and a woman with a unicornuate uterus had a 13.2% IR. This study suggests also that specific anomalous uteri, such as bicornuate and unicornuate uteri, have lower IVF success rates, but these studies also suffer from small numbers.

**Table (1): Characteristic of patient.**

<table>
<thead>
<tr>
<th>Bicornuate</th>
<th>Unicornuate</th>
<th>Septate Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient number</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Age (year/mean)</td>
<td>±28</td>
<td>±22</td>
</tr>
<tr>
<td>1st infertility</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>2nd infertility</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table (2): Summary of reproductive outcomes in uterine anomalies.**

<table>
<thead>
<tr>
<th>Bicornuate</th>
<th>Unicornuate</th>
<th>Septate</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>No/clinical preg</td>
<td>No/miscarriage/preterm</td>
<td>No/live birth</td>
<td>No/ectopic</td>
</tr>
<tr>
<td>7</td>
<td>3/3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0/2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

In general, uterine anomalies present some difficulty in pregnancy retention and overall pregnancy outcome with natural conception and ART. Pregnancy outcomes are very similar when compared with known historical controls [1,4,5]. Not all the studies included data on live birth rates, preterm delivery rates and ectopic rates. In two of the three studies that looked at reproductive outcome of the arcuate uterus, Acien [4] showed significant reduction in liveborn rates and increase in miscarriage rates. The study is vague on the difference between the arcuate uterus and the
uterine septum. Therefore, interpretation of the results is difficult. Another study showed that a septal length <1cm has a similar reproductive outcome to septi that were completely resected [12]. By definition, an arcuate uterus has an intraterine indentation of <1cm. Overall, the arcuate uterus probably does not have an impact on reproduction and obstetrical outcomes.

The impact of a septate uterus is most apparent on miscarriages. Of patients with a uterine septum, 25.5% had a miscarriage and surgical treatment is most effective [1]. Data on the reproductive outcome are abundant. Includes a compilation of the multiple studies that looked at untreated septate uterus [1,7]. Kupesic [7] compiled 13 studies looking at uterine septum and reproductive outcome but did not include data on live birth rates and ectopic rates, unfortunately. The septate uterus has a major impact on pregnancy retention, with a significant chance of miscarriage. The heterogeneity of subjects in each study is apparent, as live birth rates can be a respectable 58.1%.

The impact of a uterine septum on infertility is less clear. Two observational studies of a total of 47 infertile subjects found 53.2% achieved pregnancy after hysteroscopic resection. No control group or symptomatic untreated subjects with septate uteri were included [8,9]. The diagnosis is usually found on a HSG during the standard infertility evaluation. Differentiation between the uterine septum and the bicornuate uterus cannot be made definitively with the HSG alone. Further evaluation of the fundal contour must be done with laparoscopy, MRI, or US because therapy is very different.

The incidence of both complete and partial uterine septi is 33.6% and it is the most common uterine anomaly [1]. Therapy originally involved wedge resection of the uterine septum, but because of improved surgical equipment and better optics, hysteroscopic resection is fairly routine and technically simple to perform. It is, in fact, an incision rather than an excision of the septum. Pregnancy outcome has been shown to significantly improve. A retrospective cohort study of women undergoing hysteroscopic resection of a uterine septum demonstrated a significant decrease in miscarriage rates from 80% to 17% and an increase in the live birth rates from 18% to 91% [8].

Poor pregnancy outcome is believed, in theory, to be due to the septum’s poor implantation environment. The septum provides a scanty vascular supply for the implanting embryo because of disruption by the septum of orderly arranged vessels in the intermediate myometrial layer of the uterus [3]. A small study looked at the site of implantation of pregnancies in subjects with uterine septum and found that the 8 of 12 pregnancies that miscarried were found on the uterine septum. The other 4 pregnancies that did not miscarry were on the lateral wall of the uterus [10]. Despite the poor numbers, this study confirms what we suspect: Implantation of pregnancy that occurs on the uterine septum has a high likelihood of miscarriage.

The incidence of bicornuate uterus has historically been the most frequent, although, as stated before, uterine septi and arcuate uteri appear to be the most common [1]. Again, the current literature is limited on the reproductive outcome of bicornuate uterus. One observational study with 56 pregnancies in 26 subjects was found. Preterm deliveries and miscarriage rates are slightly elevated compared with historical controls, 25% and 25%, respectively. This is likely directly correlated with the severity of the fundal indentation of the bicornuate uterus [1]. No studies have looked at the impact of such an anomaly on infertility. However, in a subpopulation of infertile subjects (n=1024), the incidence of bicornuate uterus was not different from that in fertile controls (n=1289), 0.5% Vs. 0.4%, respectively [1]. This suggests that the bicornuate uterus probably does not affect infertility unless recurrent miscarriages are diagnosed or other infertility factors cannot be ruled out.

Surgical reconstruction for the bicornuate uterus can be considered for patients with recurrent miscarriages and no other obvious etiologies although data on improved pregnancy maintenance are limited. In general, live birth rates improve in a selected population from 2%-21% to 60%-86%. The largest retrospective cohort study looked at 21 subjects [11]. In 8 subjects, there were improved live birth rate from 0% to 80% and a decreased miscarriage rate from 64% to 20% after surgical correction. In the same study, it is interesting to note that the 13 subjects who did not undergo surgical correction had a respectable 30% miscarriage rate and a 57% live birth rate. Another small observational study in 14 subjects found an improved live birth rate from 21% prior to metroplasty to 82% after metroplasty [12]. Based on these poor data, surgical correction of a bicornuate uterus to improve pregnancy maintenance is not recommended.

Nevertheless, if surgical correction of a bicornuate uterus for pregnancy maintenance is elected, a Strassman metroplasty is performed [1]. This technique involves a transverse fundal incision into the separated uterine cavity and subsequent reconstruction in a layered closure of a vertical
incision similar to the closure of a classic incision during a cesarean section. No data exist advocating surgical correction for infertility indications and this is not recommended.

Three studies have looked at uterine anomalies and IVF outcome. The first study looked at 38 subjects undergoing 119 oocyte retrievals and compared their pregnancy outcome with a French national database of 7677 IVF egg retrievals over the same time span [13]. Comparable numbers were obtained for number of transfers attempted per retrieval, number of oocytes obtained per retrieval, and mean number of embryos transferred. Nevertheless, pregnancy rates per retrieval (11.7% vs. 19.1%), pregnancy rates per transfer (13.6% vs. 24.9%) and implantation rate (pregnancy rate/embryo) (5.8% vs. 11.7%) were all lower than the French national IVF database. Surgically treated uterine septi had a non-statistically significant difference in implantation rate, but untreated septum and unicornuate uteri had a 50% reduction in pregnancy rate per transfer and implantation rate. Patients with a bicornuate uterus also had a 50% reduction in pregnancy rate per transfer and implantation rate.

The second study compared IVF rates with a historical control [14]. Looking at only 17 subjects with uterine anomalies undergoing 55 IVF cycles, this study found a lower delivery rate per embryo transfer compared with a historical database at the same hospital and facility (8.2% vs. 17.5%-19%). The study stated that unicornuate uterus had a reasonable pregnancy rate of 19.4% (no control data were provided) but an especially high ectopic pregnancy rate (37.3% in uterine malformations vs. 38.8% in controls) and implantation rates (17.5% in uterine malformations vs. 13.0% in controls) were similar. Subjects with a bicornuate uterus had a 47.3% implantation rate (IR), those with a septate uterus had a 22.5% IR, those with a bicornuate uterus had an 11.6% IR and a woman with a unicornuate uterus had a 13.2% IR. This study suggests also that specific anomalous uteri, such as bicornuate and unicornuate uteri, have lower IVF success rates, but these studies also suffer from small numbers.

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Conclusion:

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