Utero-adnexal damage in septic abortion. Histopathological study on 91 cases

M. BIRIȘ1), MIHAELA MOLDOVAN2), D. PĂSCUȚ1), A. MOTOC1)

1)2nd Department of Obstetrics–Gynecology, "Victor Babeș" University of Medicine and Pharmacy, Timișoara
2)Pathology Laboratory, "Dr. D. Popescu" Clinical Hospital, Timișoara

Abstract

Septic abortion represents the main causes of abortion-induced maternal death. Hysterectomy may represent a beneficial therapeutic solution for septic abortion, nevertheless with irreversible effects on a woman's reproductive condition. The study analyzes the anatomopathological damage found in ninety-one patients hospitalized for septic abortion. The patients were admitted to the "Dr. D. Popescu" Clinical Hospital, Timișoara, between 1980–1989 and 1999–2008; hysterectomy was performed in all the cases to eliminate uterine sepsis responsible for the emerging complications.

Keywords: septic abortion, acute endometritis, uterine necrosis.

Introduction

Septic abortion is an abortion associated with fever, endometritis and parametritis [1–3], which remains one of the most life-threatening disorders for women all over the world [4–6]. The infection gradually involves the structure of the ovum (chorioamnionitis) and the endometrium (endometritis), subsequently spreading to the lymph and/or blood flow, or becoming generalized [7–9].

WHO defines unsafe abortion as “a procedure for terminating unwanted pregnancy either by persons lacking the necessary skills or in an environment lacking minimal medical standards or both” [10].

Septic abortion is in most cases the consequence of unsafe abortion, representing the main cause of maternal death and morbidity in pregnancy termination [3].

WHO estimates 20 million unsafe abortions in 2003, 98% of which occurring in developing countries with restrictive laws on abortion. There are 76 000 deaths/year caused by septic abortions [11] (Table 1).

The pro-birth policy, enforced in Romania during 1966–1989, by severely restricting abortion and contraception, resulted in approximately 10 000 maternal deaths and the impaired fertility of about 20% of the women of reproductive age [12].

Septic abortion, once the main cause of maternal death, has nowadays become less common, mostly due to permissive legislation. Still, any abortion may be complicated by endometritis that can subsequently develop into metritis, parametritis and peritonitis [13].

During 1980–1989, when abortion was practically prohibited in Romania, the incidence of septic abortion in the “Dr. D. Popescu” Clinical Hospital, Timișoara, was 9.59 cases in 100 births, i.e. 9.93% of overall incomplete abortions, 90 women requiring hysterectomy [14]. Following the liberalization of abortion (December 1989), these figures have progressively diminished, reaching 1.35 cases in 100 births, i.e. 9.35% of overall incomplete abortions, during 1999–2008, with a single hysterectomy necessary to eliminate sepsis (Table 2).
outcome. The most common loco-regional complications during 1980–1989, when abortion was banned in generalized peritonitis) [15].

Abortions.

damage and to establish clinical correlations in septic abortion can be classified in three stages:

1. stage I: infection is limited to the endometrium and uterine contents;
2. stage II: infection exceeds the endometrium and pervades the uterine wall (myometrium), the adnexes, the parametrium and broad ligaments;
3. stage III: infections spreads to the lesser pelvis or to the entire peritoneal cavity (pelviperitonitis or generalized peritonitis) [15].

The aim of the study is to assess utero-adnexal damage and to establish clinical correlations in septic abortions.

In the “Dr. D. Popescu” Clinical Hospital, Timișoara, during 1980–1989, when abortion was banned in Romania, 31% of the septic abortions had a severe outcome. The most common loco-regional complications were: diffuse peritonitis (36.8%), pelvic abscesses (24.6%), uterine necrosis (17.8%), pelviperitonitis (6.8%), and metritis (3.4%). The most common general complications were: septic shock (45.8%), organ failure (kidneys, liver, lungs) (19.8%), severe anemia (19.4%), and coagulopathy (13.3%). There were 98 deaths, 6.7% of the overall septic abortions with severe outcome, 200 cases/100 000 live births.

Material and Methods

This twenty-year retrospective study analyzes the histological specimens from 91 hysterectomized patients with septic abortions during 1980–1989 and from a single patient during 1999–2008. The specimens were fixed in 10% buffered neutral paraffin-embedded formalin, and the slides were stained with Hematoxylin–Eosin and regular Periodic Acid Schiff.

The study assessed the incidence of the following disorders:

- acute cervicitis, defined by edema, hyperemia, polymorphonuclear neutrophil exudate in the mucosa and subjacent tissues, presence of microabscesses in the glands and in the superficial layers of the exocervical squamous epithelium;
- chronic cervicitis, defined by diffuse or nodular lymphocyte, plasmocyte or histiocyte inflammatory infiltration – follicular cervicitis [16, 17];
- acute endometritis, characterized by diffuse suppuration with predominant necrosis, sometimes associated with syncytial endometritis;
- syncytial endometritis, defined by syncitiotrophoblastic transformation of muscle fibers, lymphoplasmocyte and granulocyte inflammatory infiltration which dissociates the myometrium, hypertrophied muscle fibers [18–21];
- acute metritis, diagnosed by the presence of massive granulocyte inflammatory infiltration which dissociates muscle fibers, vascular ectasia, vascular thrombosis, limited areas of syncitiotrophoblastic transformation of myometrial fibers, interstitial edema [22–24];
- uterine necrosis, diagnosed by the presence of vascular thrombosis, hemorrhagic infiltration with tissue disorganization, cell necrosis, edema and dilaceration of muscle fibers with the impossibility of discerning the structure [25];
- purulent salpingitis, defined by edematous, hyperemic mucosa with leucocyte infiltration and extensive epithelial desquamation, the surface of mucosa covered with purulent exudation;
- pyosalpinx, characterized by purulent exudation distending the tubal lumen; massive leucocyte infiltration in the mucosa with extensive supplicative inflammatory necrosis pervading the entire thickness of the tubal wall;
- tubo-ovarian abscess, defined by massive leucocyte and hemorrhagic infiltration, thrombosis with septic necrobiosis and structural disorganization with inflammatory infiltration [16].

Results

Table 4 summarizes the results obtained in the study group (n=91).

Table 4 – Incidence of different types of anatomopathological damages

<table>
<thead>
<tr>
<th>Anatomopathological damage</th>
<th>Incidence in the study group (n=91)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute cervicitis</td>
<td>27 (29.67%)</td>
</tr>
<tr>
<td>Chronic cervicitis</td>
<td>61 (67.03%)</td>
</tr>
<tr>
<td>Acute endometritis</td>
<td>91 (100%)</td>
</tr>
<tr>
<td>Syncytial endometritis</td>
<td>23 (25.27%)</td>
</tr>
<tr>
<td>Acute metritis</td>
<td>91 (100%)</td>
</tr>
<tr>
<td>Uterine necrosis</td>
<td>47 (51.64%)</td>
</tr>
<tr>
<td>Purulent salpingitis</td>
<td>3 (3.29%)</td>
</tr>
<tr>
<td>Pyosalpinx</td>
<td>23 (25.27%)</td>
</tr>
<tr>
<td>Tubo-ovarian abscess</td>
<td>15 (16.48%)</td>
</tr>
</tbody>
</table>

Thirty-four patients died despite having been hysterectomized. Death occurred because of septic shock, coagulopathy or multi-system failure. In most patients, death was correlated with uterine necrosis (Table 5).

Table 5 – Incidence of the most significant uterine damage in the deceased patients

<table>
<thead>
<tr>
<th>Anatomopathological damage</th>
<th>Incidence in the deceased patients (n=34)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endometritis + metritis</td>
<td>7 (20.58%)</td>
</tr>
<tr>
<td>Endometritis + metritis + uterine necrosis</td>
<td>27 (79.42%)</td>
</tr>
</tbody>
</table>

Chronic cervicitis (Figure 1) may be considered unrelated disorders, consecutive to various vaginitis, nonetheless acute cervicitis with intraepithelial abscesses are the result of the direct action of pathogenic agents or of the spreading of the inflammatory process from septic endometritis into the blood flow.

Table 3 – Incidence of septic abortion in the “Dr. D. Popescu” Clinical Hospital, Timișoara, per age groups and marital status, during 1980–1989

<table>
<thead>
<tr>
<th>Age group [years]</th>
<th>Married [%]</th>
<th>Single [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>15–20</td>
<td>5.7</td>
<td>25.7</td>
</tr>
<tr>
<td>21–30</td>
<td>58.3</td>
<td>43.4</td>
</tr>
<tr>
<td>31–35</td>
<td>21.8</td>
<td>18.6</td>
</tr>
<tr>
<td>36–40</td>
<td>10.9</td>
<td>8.8</td>
</tr>
<tr>
<td>41–45</td>
<td>3.3</td>
<td>3.5</td>
</tr>
</tbody>
</table>
Acute endometritis is a constant characteristic in septic abortion, representing the starting point of uterine infection (Figure 2). Syncytial endometritis may sometimes be associated with acute endometritis (25.27% of the cases) (Figures 3 and 4). Acute metritis was present in all the cases, indicating that the staging of the abortion has been exceeded and confirming the necessity for hysterectomy (Figures 5 and 6).
The most severe post-abortion damage (mortality 79.42%) was uterine necrosis. The disorder has a wide-ranging macroscopical picture, from localized necrosis (21 cases) in various regions of the uterine body (most commonly in the right cornual area) or in the isthmus, to generalized uterine necrosis (26 cases), sometimes extended to the lumbo-ovarian pedicles, with utero-adnexal infarction (13 cases; 27.7%), and even to the extragenital tissue: peritoneum, mesentery (three cases), abdominal subcutaneous cell tissue (four cases). In most cases, the uterus was enlarged, flaccid, purplish all over or only in some areas which alternated with the livid surface yielding a marble-skin aspect, while the adnexes had an edematous and bruised aspect. Microscopically, uterine necrosis is characterized by vascular thrombosis, hemorrhagic infiltration with tissue disorganization, cell necrosis, edema and microfibril dilaceration which made structure identification impossible (Figure 7).

In 58 cases, the damage had also spread to the adnexes, thus necessitating adnexectomy (Figures 8–10).

**Discussion**

The present study, probably one of the most comprehensive ones in Romanian literature, manages to demonstrate the severity of uterine necrosis, the latter being present in 27 (79.42%) of the 34 women that died following hysterectomy. Achim V et al. conducted an anatomopathological study on a much smaller group consisting of 30 women with septic abortion, who had undergone total hysterectomy with or without adnexectomy, and found the following uterine disorders [26]:

**Macroscopic damage**

Macroscopic damage:
**Microscopic damage**

Microscopic damage: decidua with dystrophic processes, of necrobiosis, necrosis and granulocytic infiltration; syncytial endomyometritis; endovascular hemorrhagic necrosis associated with extensive ulceration of the decidua, and involving variable depths of the subjacent myometrial layer; polymorphonuclear leukocyte infiltration delimiting the necrotic areas; myometrium with variable degrees of edematous dystrophy, poor and dispersed interstitial and perivascular lympho-plasmocytic infiltration, blood stasis and vascular thrombosis; location predominantly in the cervix and isthmus of blood stasis, vascular thrombosis and hemorrhagic necrosis.

Alessandrescu D et al. analyzed the data obtained from the anatomopathological exam in 32 pregnant women (pregnancies between 2nd and 4th month) who died from post-abortion septic shock, and bacterial cultures in the uterine exudate showed mixed flora, *coli and perfringens* [27].

Inflammatory disorders were found mainly in the uterus, the entryway for germs (25 cases). These disorders were represented by endometritis with predominant necrosis, sometimes associated with interstitial endometritis. Uterine necrosis was found in five cases, associated with massive edema, dilaceration of muscle fibers, necrosis and thrombi in several vessels. Septic foci in other organs (lung, kidney) were found in eight cases, characterized by predominant alternative damage and necrosis, the leukocyte reactive component being extremely weak.

The extension of the uterine septic process has been proved by the presence of vasculo-circulatory and dystrophic damage in parenchymal organs.

In the uterus, hemorrhage developed in the form of blood pools, mainly located in the depth of the cervical wall, and in a few cases, in the uterine body. The following disorders were found in the liver: the Diesse’s spaces and the connective tissue of the portal spaces were flooded with blood; discrete dystrophic cell alterations; these disorders developed into necrosis in patients where the damage persisted over a longer period of time (>5 days). In the lungs, interstitial hemorrhage was associated with massive interstitial and alveolar edema. These alterations gave an aspect of “heavy and damp” lung, common in every type of shock. The suprarenal glands were the sites of focal or diffuse hemorrhages. The kidneys presented: ischemic necrosis of the distal and proximal duct, and four patients had total and bilateral necrosis of the renal cortex together with bilateral suprarenal necrosis.

Our observations on the development of inflammatory damage, and mainly of the vasculo-circulatory damage, have proven in most cases that the damage begins in the uterus and subsequently spreads to several viscera, becoming generalized.

**Conclusions**

The most significant damage in septic abortion was endometritis, metritis and uterine necrosis. The occurrence of metritis requires hysterectomy, if possible before septic shock sets in. It is difficult to foresee how long it takes the condition to worsen. The aggravation of uterine damage, indicated by uterine necrosis is fatal in most cases, even after the removal of the septic focus. In our study, 79.42% of the deceased patients had uterine necrosis.

**References**


Corresponding author
Marius Biriș, Teaching Assistant, MD, PhD candidate, 2nd Department of Obstetrics–Gynecology, Faculty of Medicine, “Victor Babeș” University of Medicine and Pharmacy, Timișoara, 2nd Clinic of Obstetrics–Gynecology, “Dr. D. Popescu” Clinical Hospital, 22–24 16 Decembrie 1989 Avenue, 300172 Timișoara, Romania; Phone +40744–212 410, e-mail: marius308@yahoo.com

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