CASE REPORT

A case of suspected illegal abortion: how clinicians may assist the forensic pathologist

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SUMMARY

Abortion may be performed in a safe or unsafe manner, the latter being a frequent and dangerous event. It can also be performed in countries where abortion is legally recognised but, for various reasons, may be undertaken in an illegal environment. We present a case of a possible illegal abortion. A woman presented to the hospital with a dead fetus, saying that she was the victim of a car accident. Forensic and gynaecological examination of the woman were carried out, along with an autopsy of the fetus. It was discovered that the woman had performed a clandestine abortion. The differential diagnosis between illegal abortion and miscarriage represents a complicated issue and requires both clinical and forensic support. The gynaecologist may be of assistance to the forensic pathologist in confirming whether an illegal abortion has been performed.

CASE PRESENTATION

We report the case of a woman, over the age of 18 years, who presented to the hospital holding her dead fetus wrapped in a towel. The placenta was still in her uterus. Complete expulsion of the placenta occurred at the hospital on the same day. During the consultation, the woman explained that she had been involved in a car accident and, as a consequence of the impact, had aborted her fetus. Since there was suspicion of an illegal abortion, the forensic pathologist and the gynaecologist performed a medical examination. The external forensic examination of the woman revealed no traumatic injuries, such as bruising, haematoma or lacerations. The gynaecologist performed a speculum examination of the cervix revealing two lesions of the uterine cervix, which were bleeding despite being cleaned with gauze (figure 1). These injuries were attributable to fetal expulsion through the pinching of the cervix with surgical forceps. An ultrasound examination revealed the absence of maternal and uterine disease or intracavitary pouring. Therefore, it was clinically evident that there was no gynaecological pathology that justified the abortion.

Subsequently, autopsy of the fetus was performed. External examination revealed a 28-week-old fetus with no malformations (figure 2). There were no abnormalities in the umbilical cord or placenta. Examination of the internal organs of the fetus showed the presence of oedematous lungs with subpleural and subepicardial petechiae (figure 3). Histological examination revealed the presence

of squamous cells and amniotic fluid in the lungs, indicative of gasping breath (figure 4). Therefore, the pathologists confirmed that the fetus had attempted to breathe for a few minutes.

The immaturity of the lungs in premature fetuses does not enable physiological respiratory functions to be undertaken in the absence of assisted ventilation. Therefore, at the moment of expulsion, the fetus attempted to breathe, evident by the presence of subconjunctival petechiae and haemorrhage from the sclera. The ineffective respiratory efforts caused acute respiratory failure and subsequent cardiorespiratory arrest. In this case, fetal death was caused by a surgical abortion; the histological evidence of respiratory attempts made by the fetus after its expulsion proved that this was a case of infanticide. Close collaboration of the forensic pathologist, gynaecologist and histopathologist is crucial for forensic investigation. The gynaecological evidence of the cervical lesions along with the histological pulmonary evidence confirmed that the fetus was still alive at birth.

GLOBAL HEALTH PROBLEM

- ▶ Abortion is a medical procedure legally recognised in some countries.
- ▶ When conducted outside of the law, an abortion is illegal or clandestine.
- ▶ Illegal abortion is a distressing dangerous reality in underdeveloped countries.
- ▶ Clinical management of suspected abortion cases requires both gynaecological and forensic support.
- ▶ The role of autopsy is crucial in the diagnosis of infanticide.
- ▶ Illegal abortions must be reported to the judicial authorities.

GLOBAL HEALTH PROBLEM ANALYSIS

Abortion is a medical procedure, performed by a team of professional gynaecologists, which should respect the appropriate safety standards and internationally recognised guidelines.^{1 2} Abortion legislation is still a controversial issue all over the world, with multiple ethical, cultural and religious implications. Legislation on abortion is different in different countries. Globally, there are 61 countries where abortion is always permitted within certain temporal limits. However, there are also some countries (El Salvador, Malta, Nicaragua, Vatican City) where abortion is not allowed under any circumstances, even in cases of serious risk to maternal

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Figure 1 Two lesions of the uterine cervix. Despite the use of gauze, speculum examination by the gynaecologist found that the lesions were persistently bleeding.

health.³ Between these two extremes, there are numerous countries, which represent the majority of cases, that protect the right to voluntary interruption of pregnancy, depending on the risk to maternal health, in cases of congenital fetal malformations, in cases of rape or in straitened economic circumstances.

In Italy, abortion is recognised in law (Law 194 of 22 May 1978). This law provides for the possibility of interrupting pregnancy within 90 days of gestation. However, there is also the possibility of abortion within 180 days for therapeutic reasons, but only if the risk to the mother's psychophysical health can be demonstrated with certainty.^{4,5} The law explicitly requires 7 days of reflection for the woman, after which the abortion is allowed. The woman can consult a hospital, or her physician, and communicate her choice. When interruption of pregnancy occurs without respect for the principles enshrined in the law, it is defined as an illegal or clandestine abortion. Illegal abortion can have criminal motives.⁶

There are no official epidemiological data on criminal abortions in the literature; there are some data on unsafe abortions. Hence this is a phenomenon that in most cases remains unknown and reported episodes represent only the tip of an iceberg.

From an epidemiological point of view, clandestine abortion is a distressing reality in many countries. A recent analysis, published by the WHO in 2012, reported that approximately

Figure 2 The 28-week-old fetus. The fetus has no anatomical malformations. There are widespread areas of maceration.

Figure 3 Subpleural and subepicardial petechiae. These signs are characteristic of a hypertensive peak, caused by hypoxia and respiratory failure.

42 million women perform abortions every year. Of these, about 20 million are unsafe abortions. The consequences for maternal health are considerable, with risks of temporary or permanent disabilities, and also death. According to the WHO, unsafe abortions cause approximately 13% of maternal deaths. It has been calculated that, every year, about 47 000 people in the world die because of unsafe abortions.⁷ There are many ways in which an unsafe abortion can be performed: by inserting inappropriate surgical instruments into the uterus; by ingestion of dangerous drugs or inappropriate doses; by procedures performed by staff not adequately prepared; and by failing to comply with hygienic conditions. The health complications for the mother include infections (the most extreme being sepsis), haemorrhage and trauma of varying severity to the female genital anatomy, including the uterus (ie, in the case of perforation) but also the cervix and vagina, or even the abdominal organs. Cases associated with iatrogenic damage to the bowel have been reported in the literature.^{8,9}

The geographical distribution of unsafe abortions is concentrated in underdeveloped countries. The continent with the highest rate is Africa, especially East Africa, but other geographic areas of the world also have very high prevalence rates, such as

Figure 4 Histological examination of the lungs showing the presence of squamous cells and amniotic fluid in the alveoli.

South and Central America and South East Asia. In these territories, mortality from unsafe procedures is much higher than in other countries. However, 54% of deaths related to unsafe abortions occur in Africa.¹⁰

Several studies have highlighted the association of the phenomenon with legislative and religious constraints, which prohibit abortion or allow it only to protect the physical health of the women.¹¹ On the African continent, there are countries (Morocco, Burkina Faso, Guinea, Liberia, Namibia, Botswana, etc) where abortion is allowed only if the mother is in real danger of life, if the fetus has congenital malformations or if pregnancy is derived from sexual violence. In other countries (Libya, Egypt, Niger, Angola, Madagascar, Nigeria) abortion is considered legal only when it is performed to save the mother's life.³ These legislative and religious restrictions greatly affect the incidence of unsafe abortions and consequently maternal morbidity and mortality. For example, it has been shown that more than 3000 women die each year in Nigeria from unsafe abortions.¹² The same issues have emerged from studies that analysed the incidence of abortions in Malawi and the Democratic Republic of the Congo where interruption of pregnancy is not recognised.^{13 14}

To date, the epidemiological analysis of the phenomenon remains complex due to the difficulties in obtaining reliable statistical data. The phenomenon of illegal abortion still suffers from lack of epidemiological surveillance, especially in underdeveloped areas. Therefore, there is a need to increase statistical surveys in these countries to control the incidence of the phenomenon and to evaluate preventive strategies. The data published to date indicate that legalisation of abortion can only partially reduce the morbidity and mortality associated with illegal procedures. In fact, several studies showed that legalisation of abortion is necessary but is not sufficient to reduce the impact of this issue. There are several countries, such as Ethiopia, that have legalised abortion, but still show very high annual rates of unsafe abortions. Ethiopia legalised abortion in 2005. Singh *et al* showed that, in Ethiopia, in 2008, only 27% of abortions were performed under legal and safe surgical procedures, despite the fact that abortion had been legalised for several years.¹⁵ Hence it is important to intervene in underdeveloped countries not only in terms of legislation but also through campaigns, to prevent unwanted pregnancies, and to promote adequate systems of safe abortion and post-abortion care.

Despite legalisation in many countries, abortion remains very frequent in sub-Saharan Africa where rates are 39 per 1000 in women aged 15–44 years.¹⁶ In contrast, Europe has the lowest rate of unsafe abortions, with rates of 3 per 1000.¹⁰ Despite their rarity, cases of illegal abortion may occur in developed countries where abortion is widely recognised. Motivations could be very different and even related to criminal activities.

The medical diagnosis of criminal abortion, abortion due to other causes and miscarriage is a complex matter and requires a multidisciplinary approach.¹⁷ The clinician can provide an essential contribution to the differential diagnosis. The medical management of the case begins with the mother's arrival at hospital. The first step must be the accurate collection of anamnestic data related to the signs and symptoms of the patient. For example, the woman may experience complications associated with the procedure performed (bleeding, signs of infection, abdominal pain). It is necessary to ask how long the signs and symptoms have occurred and whether there are any associated causes. When the physician suspects a criminal abortion, he/she must report it to the judicial authority.

With regard to the examination, it is important to follow a multidisciplinary approach involving both the gynaecologist and the forensic pathologist.

Forensic examination of the patient is crucial, not only to assess the presence or absence of signs of trauma, but also to evaluate the timing of the lesions and to compare them with the patient's report. In the case presented here, the absence of signs of trauma was incompatible with the dynamics of the circumstances (car accident) related by the mother, and increased the suspicion of non-spontaneous abortion. The gynaecological examination is crucial because it identifies the signs associated with induced abortion and provides a definitive diagnosis. The procedure must be biphasic and comprise examination of the genital anatomy, including the uterine cervix, by using a speculum. In addition, transvaginal ultrasound examination makes it possible to exclude uterine wall abnormalities or any pregnancy related illness. In the case described here, gynaecological examination showed the presence of two persistent bleeding injuries in the uterine cervix. Ultrasound examination excluded the presence of uterine pathologies that could justify miscarriage. The lesions on the cervix were typical of fetal expulsion by the pinching of the cervix with surgical forceps. Therefore, the woman undoubtedly performed an induced abortion.

The clinical diagnosis can be confirmed by further forensic investigations, such as autopsy on the fetus. In the Italian legal system this procedure is authorised by the Public Prosecutor's Office for cases where criminal activity is suspected. Forensic evaluation of the fetus in cases of suspicious illegal abortion focuses on three fundamental aspects: (1) exclusion of fetal congenital malformations; (2) evaluation of fetal anomalies, particularly the placenta and umbilical cord; and (3) microscopic histological analysis of the pulmonary alveoli. The latter investigation is aimed at assessing whether the fetus has breathed autonomously. The most relevant sign to confirm respiratory gasping is the microscopic evaluation of alveolar dilatation. At the time of breathing, the placental circulation is replaced by the new pulmonary circulation. Therefore, the sects appear subtle and full of blood, and the alveoli dilated. Historically, there are several tests to assess whether the fetus has breathed, such as the so-called lung floating test.^{18–20} This is based on the principle that, if the fetus has breathed, the lung tends to float in water due to the lower specific air weight. This test has now been replaced by microscopic lung analysis. Squamous cells were found in this case, which are pathognomonic of respiratory gasping. Indeed, subpleural and subepicardial petechiae and scleral bleeding are typical signs of hypertensive peak, caused by acute respiratory failure of the fetus after its expulsion.

From a forensic point of view this case is emblematic because it can also be classified as an atypical episode of infanticide. The term infanticide has forensic implications and applies mainly to the killing of a child under the age of 12 months.

The term 'infanticide' must be distinguished from the terms 'filicide' and 'neonaticide'. Filicide is a generic term referring to the killing of a son; neonaticide is specifically the killing of a newborn on the day of birth.²¹

Infanticide is a major social and health problem worldwide. Recently, Ahrens *et al* reported epidemiological data on infant mortality resulting from external causes in children less than 1 year of age. They showed that in the USA, from 2000 to 2010, 303 936 children died by the age of 1 year. Of these, approximately 6% died from external causes. Among the external causes, 21% were due to intentional homicide and 72% to unintentional injuries. Epidemiological data have shown that twins have a 40% greater risk of dying from external causes.²² The parents of twins endure a greater level of anxiety and depression than the parents of singletons. These data have been anticipated in previous studies, which found the greatest risk of maltreatment and mortality for twins.²³

The killing of infants is one of the most frequent forms of homicide committed by women. In fact, the perpetrator of an infanticide or a neonaticide is, in most cases, the biological mother. These two phenomena can be distinguished in terms of the associated risk factors and the psychopathological features of the perpetrator. In this regard, Porter *et al* investigated differences between infanticidal and neonaticidal women. A 40-year literature review revealed that the typical neonaticidal woman does not have any psychiatric disease in her medical history but has an unwanted pregnancy and consciously decides to kill the newborn. Most newborns killed on the first day of life are born outside of hospital, often in the maternal home. Neonaticidal mothers seem to be younger (approximately 20 years of age) than infanticidal mothers and are, in most cases, single women.²⁴

In infanticide, the mother is older (28–30 years) and more frequently married.^{25–26} Several risk factors are associated with this phenomenon. In most cases, it is committed by a mother who has not fully recovered from the effects of pregnancy and suffers some degree of mental disturbance. Postpartum psychosis, schizophrenia, depression and bipolar disorder are the most frequently associated psychiatric disorders.^{27–30} However, the correlation between psychiatric pathologies and infanticide is not always present. There are other factors, such as school dropout rate, and the psychological traits of the mother (ie, anger and thoughts of aggression or violence towards the child). The most common methods of infanticide/neonaticide are asphyxia, such as smothering, suffocation, strangulation and drowning, but there are also cases of burning, poisoning or defenestration.²⁴ In our case, autopsy showed that death was due to asphyxia.

Our case is emblematic because it shows not only that infanticide and clandestine abortion can still occur but also how these two phenomena can coexist. These crimes can involve the clinician and hence the clinician must evaluate suspected cases and support the forensic pathologist in the diagnosis.^{31–33} The differential diagnosis of a clandestine abortion requires clinical gynaecological input to evaluate the symptoms, signs and ultrasound findings to support the forensic autopsy evidence. Physicians must report suspected illegal abortions to the judicial authorities.

Learning points

- Clandestine abortion is a major problem in underdeveloped countries.
- Mortality arising from unsafe abortion is higher in underdeveloped countries.
- Most cases of criminal abortion remain unknown.
- Speculum cervical examination and ultrasound investigation are fundamental in the differential diagnosis of miscarriage, abortion due to other causes and criminal abortion.
- Autopsy and histological analysis of the fetal lungs can determine whether the fetus attempted to breathe.

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