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SPECIAL COMMUNICATION

Claims of misoprostol use based on blood sampling should be viewed with skepticism

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ABSTRACT

Efforts to prosecute women for induced abortion have included allegations that misoprostol was found in body fluids. These claims, however, are questionable owing to the timing of specimen collection for accurate results, the scarcity and expense of validated assays, and the onerous lab procedures required to determine the presence of the substance. Adequate scrutiny should be applied each time such a claim is made.

1. Background

In Baja California, Mexico, a 32-year-old presented at a public hospital with a hemorrhage and, based on an anonymous tip, she was investigated for inducing an illegal abortion. Health personnel took a blood sample in which they allegedly found misoprostol.

In Lawrence, MA, USA, an 18-year-old woman gave birth to a premature baby and was charged with "procuring a miscarriage." The grand jury testimony cited evidence of misoprostol in the fetal urine.

In Mexico State, Mexico, a 29-year-old woman went to a public hospital with severe abdominal pains and hemorrhage; she was accused of inducing an illegal abortion. Health personnel reported that they took a urine sample in which they allegedly found misoprostol.

These are just a few cases where women have been accused of inducing an abortion based on alleged evidence of misoprostol found in body fluids. Each woman was later exonerated. The present paper discusses the challenges associated with detecting misoprostol in such cases.

2. Challenges associated with measuring misoprostol

2.1. Timing

It is not possible to detect misoprostol itself in blood plasma [1]. Misoprostol is rapidly metabolized into misoprostol acid (MPA), which has an elimination half-life of 20–40 minutes [2]. Depending on the dose, the route via which the drug is taken, and the peak plasma level achieved, the amount of time the drug remains detectable in the body will differ slightly [2–6]. Given available detection techniques, a 600-μg dose of oral misoprostol is no longer detectable after six hours [7]. Higher peak plasma levels are achieved via the sublingual route and a slower decline is observed by the vaginal route, but regardless of the route of administration, the short half-life requires a blood draw soon after ingestion to reliably detect MPA in plasma.

If a woman induces an abortion with misoprostol, depending on the dose and route, the average time between taking the drug and expelling the fetus is 6–8 hours in the first trimester and 10–20 hours in the second trimester [8–13]. Misoprostol induces uterine contractions that usually continue long after the medication is undetectable in the woman's body, as part of the mechanism of action is to induce the body to produce natural prostaglandins as it would with a spontaneous abortion. Suspicion of induced abortion with misoprostol generally occurs well after expulsion, meaning many hours have passed since the alleged misoprostol administration. During the intervening hours, the misoprostol is rapidly metabolized and, depending on the interval between taking the drug and suspicion, it will likely be undetectable in a blood sample.

2.2. Specimen management

If a blood sample is obtained early enough, it must be carefully handled. Validated methods of measuring MPA include immediate centrifugation of the sample, freezing it in liquid nitrogen, and then maintenance of the sample at −10 °C to −20 °C [5–7,14]. Any transport of the sample should be done in a cooler with dry ice [6,15]. Transport is typically required because few labs have the ability to measure MPA. Most labs with the ability to run MPA assays are located in Asia and Europe. If a centrifuged sample is left at room temperature, MPA

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should be analyzed within four hours [7]. In whole blood samples, MPA also degrades at room temperature but at a slower rate [16].

2.3. Validated assays

The next hurdle is finding a laboratory capable of handling the blood sample. Misoprostol acid can be detected by one of three validated assays, each with lower limits of detection of between 1 and 10 pg/mL. These validated assays are rarely commercially available and are expensive, costing around US $100 at one lab. To analyze the sample, a gas chromatography–mass spectrometry machine or alternatively a liquid chromatography–mass spectrometry machine is required. Radioimmunoassay has the potential to detect other prostaglandin metabolites, thus it is subject to nonspecificity [5]. For instance, very common cannabinoid metabolites have up to 100% cross-reactivity with antibodies for prostaglandin metabolites with some commercially available antibodies used in radioimmunoassay [17].

2.4. Documentation

Laboratories that perform these complicated chromatographic or spectrometric confirmations are able to provide detailed documentation specifying the procedure used, timing of sampling and testing, volume of the specimen received, amount of MPA detected, and the validation of the MPA assay at that particular laboratory. A quality control sample should be run alongside the index sample to ensure that the assay is performing properly on that day. If these details are unavailable, there is reason to doubt the veracity of the findings.

2.5. Other fluids

For any other body fluid (fetal blood, urine, breast milk) the same issues of lack of availability of assays, short half-life, and onerous testing procedures apply. However, misoprostol metabolite levels would be even lower in these other fluids. Consequently, claims of misoprostol detected in most body fluids should be further questioned.

3. Conclusion

In all three cases highlighted, knowledge of the requirements for the detection of misoprostol in body fluids might have led to quicker exoneration of the accused women.

Misoprostol becomes rapidly undetectable in blood and other body fluids and, even if samples are immediately obtained and appropriately handled, detecting it requires an onerous and expensive process that few facilities are capable of performing. Claims that misoprostol was found in blood or other body fluids should be thoroughly scrutinized.

Conflict of interest

The authors have no conflicts of interest.

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