

# Excessive seepage during MITS procedure: an explorative study to identify the underlying causes

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## Background

Minimally invasive tissue sampling (MITS) is a postmortem sample collection approach used to identify the cause of death where full diagnostic autopsy is not feasible. MITS findings are helping to identify and analyze specific causes of stillbirth and death in children under 5 years of age in areas of Sub-Saharan Africa and South Asia under the Child Health and Mortality Prevention Surveillance (CHAMPS) Network.

- Tissue samples are collected using specialized needles, from five puncture sites during the MITS procedure.
- Families, who are largely unfamiliar with this procedure, may have social, cultural and religious concerns about consenting.
- **Sometimes excessive seepage occurs from the puncture sites that may cause family dissatisfaction or give rise to community rumors leading to reduced acceptance for MITS.**

## Case study

A male neonate with preterm low birth weight (1.7 kg) with respiratory distress died on 4th day of hospital admission. After family consent, the MITS procedure was conducted. The child had excessive seepage during the MITS procedure, which persisted until the burial process. The shroud cloth became soaked with seepage which was noticed by the family and the community members. This instilled guilt in family members for consenting to MITS. Several misperceptions and rumors had spread throughout the community including:

- the internal organs were all extracted from the puncture sites
- parents sold the organs of their baby
- the child could have been alive when the samples were taken; otherwise, there would have been no seepage.

As a result of this incident, the CHAMPS Bangladesh site temporarily suspended MITS procedures to assuage community rumors. This case demonstrates the importance of family counseling regarding the possibility of seepage prior to MITS.

The objective of the study was to

- **identify characteristics that increase the chance of excessive seepage** so that additional counseling can be provided regarding the possibility of excessive seepage to the family before the procedure.

## Methods

We enrolled MITS cases between September 2017 and December 2020 at the CHAMPS Bangladesh site. Trained physicians of CHAMPS performed physical examinations of the children who were undergoing MITS. The examination findings were documented. Excessive seepage from the needle puncture site was noted during the MITS procedure. The external characteristics of children with excessive seepage were then analyzed against the rest of the MITS cases in the same age group without excessive seepage.

## Results

Between September 2017 and December 2020, we conducted 213 MITS at the CHAMPS Bangladesh site.

- 11% (23/213) of the cases had excessive seepage. All were either stillborn (17%, 4/23) or died during the first week of life (74%, 17/23).
- We compared them to 180 other stillbirth (54%, 97/180) and early neonatal death (46%, 83/180) cases undergoing MITS but without excessive seepage.
- 27% (63/203) of the total 203 cases had spontaneous bleeding without any trauma prior to MITS.
- Incidence of bleeding was significantly higher (56%, 13/23) among children with excessive seepage.
- Cases with excessive seepage had a higher proportion of prior bleeding from nose and mouth compared to cases without excessive seepage (Table 1).
- Among the children with excessive seepage, none had bleeding from ear and none of the stillbirths were macerated.
- No significant associations were found between maternal obstetric conditions as shown in table 2
- Children with bleeding from the nose had a 3.7-fold increased risk of excessive seepage (95% CI: 1.1-12.0, p<0.05), as shown in Table 3.

**Table 1: Characteristics of children with and without excessive seepage**

Characteristics	Sample (n=203)	
	Excessive seepage (n=23)	No excessive seepage (n=180)
Stillborn (fresh)	4 (2%)	44 (24%)
Stillborn (macerated)	0 (0%)	52 (29%)
Preterm	14 (61%)	97 (54%)
Bleeding from the nose	11 (48%)	37 (21%)
Bleeding from the mouth	6 (26%)	25 (14%)
Bleeding from the ear	0 (0%)	7 (3.9%)
Distended abdomen	6 (26%)	21 (12%)
Hepatomegaly	7 (30%)	23 (13%)

**Table 2: Relationship of maternal obstetric characteristics with excessive seepage**

Characteristics	Excessive seepage	No excessive seepage	Odds ratio	95% CI
Pregnancy induced hypertension	2	5	0.64	0.05 to 4.75
Preterm labor	2	8	0.21	0.01 to 1.81
Caesarean section	6	22	0.41	0.07 to 1.80
Premature rupture of membrane	6	38	0.06	0.01 to 0.70

- In stillborn children, the odds of excessive seepage were lower (OR: 0.1, 95% CI: 0.1-0.6) than in early neonatal deaths.

**Table 3: Association of external characteristics of children with excessive seepage**

Characteristics	Odds ratio	95% CI	p value
Stillbirth	0.18	0.06 to 0.56	<0.01
Preterm	1.33	0.55 to 3.23	0.26
Bleeding from the nose	3.54	1.45 to 8.87	<0.01
Bleeding from the mouth	2.19	0.79 to 6.08	0.06

## Conclusions

Preliminary findings indicate that children with the following characteristics have a greater risk of excessive seepage during the MITS procedure:

- **Death within the first seven days of birth**
- **Having signs of bleeding prior to the MITS procedure from nose and not from the ears.**

Approximately 10% MITS cases meet the above definition (91% of the excessive seepage cases) and considering our guidelines, family members of such children should be counseled in advance of the MITS procedure about the possibility of seepage to sensitize them.

Identifying such cases based on these characteristics and providing appropriate family counseling can help minimize post-MITS dissatisfaction or rumors.

See more data at [champshealth.org](http://champshealth.org)



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