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Patient's characteristics and incidence of fecal incontinence after primary repair of Obstetric Anal Sphincter Injuries (OASIS) at three Indonesian tertiary hospitals in 2014–2016



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ABSTRACT

Introduction: Obstetric Anal Sphincter Injuries (OASIS) is a common complication of vaginal delivery. The incidence was 4.53 % of total vaginal deliveries. OASIS is associated with an increased risk of fecal incontinence (FI), which affects one's quality of life. The incidence of OASIS and FI varied from study to study. In this study, we described the characteristics of patients with OASIS at three Indonesian tertiary hospitals in 2014–2016 and FI outcome among those patients.

Methodology: This is a descriptive study on the characteristics of OASIS patients after primary repair in three tertiary hospitals: dr. Cipto Mangunkusumo National General Hospital, Persahabatan General Hospital and Fatmawati General Hospital from 2014 to 2016. From a total of 234 patients, only 58 patients could be contacted and interviewed using Revised Fecal Incontinence Score (RFIS) questionnaires. Out of the 58 patients, only 16 patients came for transperineal ultrasound. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 20.

Results: From a total of 234 patients, the mean age was 26.6 years old with a mean Body Mass Index (BMI) of 24.8 kg/m². Most of the patients were nulliparous (67.5 %) and the median duration of second stage of labor was 45 min. Episiotomy was not performed on most patients (59.4 %) and most of them underwent spontaneous vaginal delivery (65.4 %) with mean baby's birthweight of 3217 g. From 58 interviewed patients, three patients complained of FI (5.2 %). Sixteen patients came for transperineal ultrasound examination, and only one of them had FI. Anal sphincter defects were identified in five patients, comprising three external anal sphincter (EAS) and two internal anal sphincter (IAS) defects. All five patients did not experience FI. One patient who had FI had no anal sphincter defect.

Discussion: This is a pilot study for the incidence of FI among the OASIS population in Jakarta, Indonesia. The incidence of FI observed in this study was relatively low (3 out of 58 patients) compared to other studies. This could be due to differences in study population. The fact that the patient with FI had intact anal sphincter suggests that other factors may contribute to the development of FI in addition to the integrity of the anal sphincter. These factors may include pelvic floor muscle and innervation of the surrounding tissues.

Conclusion: The outcomes of primary repair of OASIS varied between studies. Patients' characteristics might play an important role in the development of OASIS as well as the outcome after repair. Further studies with larger sample size are needed.

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Introduction

Obstetric Anal Sphincter Injuries (OASIS) is a common complication of vaginal delivery, which could be diagnosed directly after delivery (overt) or later using ultrasound of the anal

sphincter (covert). The incidence of OASIS varied between studies. In 2012, the incidence was 4.53 % of total vaginal deliveries in dr. Cipto Mangunkusumo National Central Hospital, Jakarta. There are several factors that contribute to the development of OASIS, such as primiparity, baby's birthweight, use of instruments during delivery (vacuum and forceps), prolonged second stage of labor, episiotomy, etc [1].

OASIS is a known major risk factor for fecal incontinence (FI). However, not every case of OASIS will result in FI, especially after

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primary repair of OASIS. FI affects the quality of life and may occur in 3.7%–74% of the population, depending on the characteristics of said population [2,3]. Questionnaires can be used as a tool to assess FI, e.g. the Revised Fecal Incontinence Score (RFIS), which acts as a scoring system to measure the severity of FI [4].

Primary repair of OASIS carries a risk of failure, and defects could be identified at the external anal sphincter (EAS) and/or internal anal sphincter (IAS). These defects can be detected by using transperineal ultrasound [5]. This study aims to describe the characteristics of patients with OASIS and the FI outcome at three tertiary hospitals in Indonesia (Figs. 1–4).

Materials and methods

This is a descriptive study observing the incidence of OASIS and FI outcomes among patients after primary repair of OASIS using RFIS. Interviewed patients were divided into 4 categories based on their RFIS score: without or very mild FI (score 0–3), mild FI (score 4–8), moderate FI (score 9–12), and severe or very severe FI (score >13).

The study population was all patients undergoing vaginal delivery and had an OASIS in 2014–2016 at dr. Cipto Mangunkusumo National General Hospital, Persahabatan General Hospital and Fatmawati General Hospital, all located in Jakarta, Indonesia. Patients who underwent vaginal delivery outside of those hospitals, and then referred to those hospitals to undergo primary repair in less than 6 h after delivery were also included in the study.



Fig. 1. Anal sphincter ultrasound of patient A, 26 years old with a history of grade IIIB perineal rupture. The patient came with mild FI symptoms and had no complaints of other pelvic floor problems. Both EAS and IAS were intact.

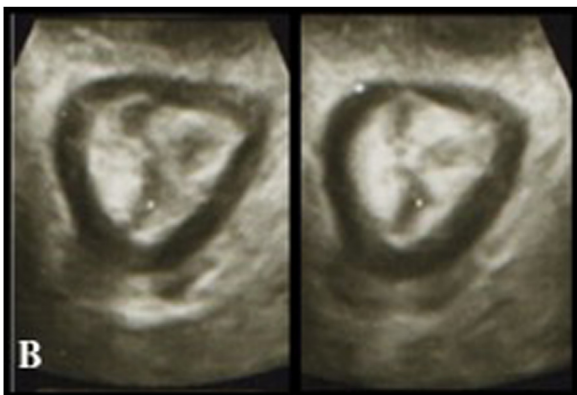


Fig. 2. Anal sphincter ultrasound of patient B, 28 years old with history of grade IIIA perineal rupture. The patient currently had no FI complaints. Ultrasound examination revealed intact EAS and IAS.

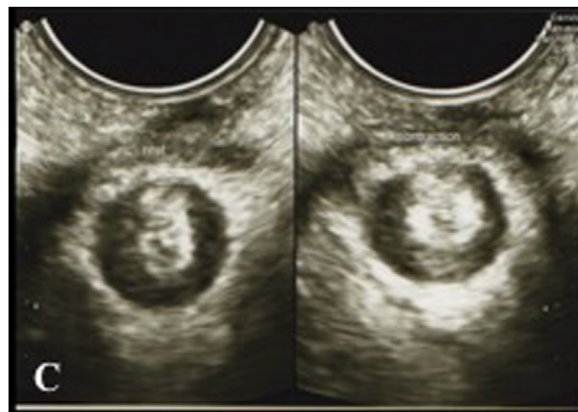


Fig. 3. Anal sphincter ultrasound of patient C, 23 years old with history of grade IV perineal rupture. The patient currently had no complaint of FI. Ultrasound examination revealed IAS defect at 12 o'clock with intact EAS.

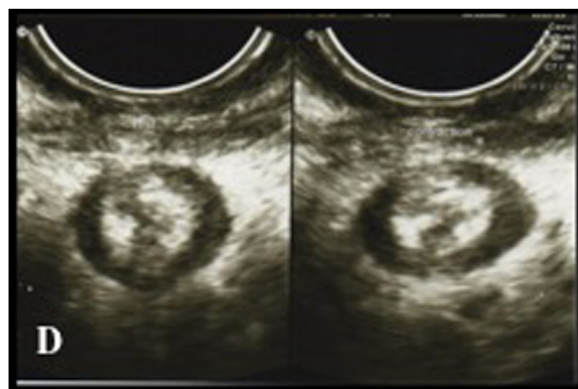


Fig. 4. Anal sphincter ultrasound of patient D, 27 years old with history of grade IIIC perineal rupture. The patient currently had no complaint of FI. Ultrasound examination revealed EAS defect at 11 o'clock, with intact IAS.

Patients with a history of pelvic trauma, hemorrhoid, stroke, diabetes mellitus, chronic diarrhea or constipation, FI prior to pregnancy/delivery and had another pregnancy after the occurrence of OASIS were excluded from the study.

This study was conducted from August 2017 to February 2018. Initial data were collected from the medical record of patients with OASIS in 2014–2016. There were a total of 234 patients, 54 patients from dr. Cipto Mangunkusumo National General Hospital, 73 patients from Fatmawati General Hospital, and 107 patients from Persahabatan General Hospital. The patients were contacted and interviewed regarding the FI complaints using RFIS. Of all patients, only 21 patients from dr. Cipto Mangunkusumo National General Hospital, 10 patients from Fatmawati General Hospital, and 27 patients from Persahabatan General Hospital could be contacted and interviewed. Among 58 patients, only 16 patients could come to the hospital and underwent transperineal ultrasound for anal sphincter evaluation. Data comprising age, Body Mass Index (BMI), parity status, delivery method, degree of perineal rupture, baby's birthweight, and episiotomy were collected through medical records.

Transperineal ultrasound examination was conducted by a urogynecologist consultant who was blinded to the delivery data, including degree of perineal rupture. The examination was conducted using GE Voluson E8 Expert BT09 (GE Medical System, Zipf, Austria) with 4.0–9.0 MHz *convex volume probe* RIC5-9-D which was covered with condoms and ultrasound gel. The probe was placed at perineum in transverse position to achieve transversal 2D picture of the anal sphincter, at rest and during

contraction. Three-dimensional pictures were subsequently taken with the anal sphincter as the area of interest, resulting in mid-sagittal and transversal picture, thus allowing the operator to clearly identify the EAS and IAS as well as the fascial plane. Afterwards, the ultrasound mode was modified into tomographic ultrasound imaging (TUI) with slice interval ranged from 1.0 to 2.5 mm.

Data analysis

Data analysis was performed using Statistical Package for the Social Sciences (SPSS) version 20 (IBM Corp., Armonk, NY). The incidence of FI among patients with OASIS was presented in number and percentage while the demographic data were presented in mean (interquartile range) or median (minimum-maximum number).

Ethics

The study was approved by the Health Research Ethics Committee of Faculty of Medicine Universitas Indonesia with ethical clearance number 928/UN2.F1/ETIK/2017. Ethical clearance was granted on October 9th, 2017.

Results

In this study, data were collected from all patients suffering from obstetric anal sphincter rupture (perineal rupture grade III-IV) who underwent vaginal delivery in 2014–2016. From three hospitals in Jakarta, there were 84 cases (2.4 % of total vaginal deliveries) of OASIS in 2014, 69 (2.6 %) cases in 2015, and 81 (4.1 %) cases in 2016. The characteristics of those patients are presented in Table 1.

Fecal incontinence (FI)

From a total of 234 OASIS patients, only 58 patients could be contacted and interviewed using the RFIS. From those 58 patients, three patients complained of FI (5.2 %): one patient with history of grade IIIB perineal rupture had a mild FI (score 4), one patient with history of grade IV perineal rupture had a moderate FI (score 10), and one patient with history of grade IIC perineal rupture had severe FI (score 13). The RFIS score of the remaining patients was 0.

Table 1
Characteristics of patients with OASIS patients in 2014–2016.

	Total (n = 234)	Patients with OASIS 2014–2016			
		Grade IIIA (76)	Grade IIIB (67)	Grade IIC (25)	Grade IV (66)
Age (Mean ± SD)	26.6 ± 6.8	26.3 ± 6.1	26.5 ± 8.2	25.2 ± 6.7	27.7 ± 6.1
BMI (Mean ± SD)	24.8 ± 2.5	24.9 ± 2.6	25.2 ± 2.5	24.9 ± 2.6	24.5 ± 2.4
Parity					
Primiparity	158 (67.5 %)	56 (73.7 %)	48 (71.6 %)	20 (80 %)	31 (47 %)
Multiparity	76 (32.5 %)	20 (26.3 %)	19 (28.4 %)	5 (20 %)	35 (53 %)
Second stage of labor duration (minutes) (Median ± IQR)	45.14 ± 40.7	30 ± 39	40 ± 45	30 ± 40	30 ± 55
Episiotomy					
Yes	95 (40.6 %)	34 (44.7 %)	27 (40.3 %)	12 (48 %)	22 (33.3 %)
No	139 (59.4 %)	42 (55.3 %)	40 (59.7 %)	13 (52 %)	44 (66.7 %)
Birthweight (Mean ± SD)	3217.08 ± 449	3177 ± 454	3123 ± 405	3282 ± 445	3332 ± 468
Delivery Methods					
Spontaneous	153 (65.4 %)	44 (57.9 %)	36 (53.7 %)	17 (68 %)	56 (84.8 %)
Vacuum	49 (20.9 %)	21 (27.6 %)	19 (28.4 %)	5 (20 %)	4 (6.1 %)
Forceps	32 (13.7 %)	11 (14.5 %)	12 (17.9 %)	3 (12 %)	6 (9.1 %)

Table 2

Transperineal Ultrasound Results of 16 OASIS Patients after Post Primary Repair.

Anal Sphincter	No Incontinence n (%)	Fecal Incontinence n (%)
EAS Defect	3 (20 %)	0
EAS Intact	12 (80 %)	1 (100 %)
IAS Defect	2 (13.3 %)	0 (0 %)
IAS Intact	13 (86.7 %)	1 (100 %)

Transperineal ultrasound of external and internal anal sphincter

After the interview, patients were asked to undergo ultrasound examinations, and only 16 patients came for the examination. Of the 16 patients, three patients had EAS defect, and two patients had IAS defect. From three patients who complained of FI, only one patient came for ultrasound examination and was revealed to have normal EAS and IAS. The results of anal sphincter ultrasound examination were presented in Table 2.

Below were some ultrasound pictures of patients after primary repair of OASIS.

Discussion

This is a descriptive study on OASIS patients from 2014 to 2016. Subjects were recruited from three tertiary hospitals in Jakarta, Indonesia, which were dr. Cipto Mangunkusumo National General Hospital, Fatmawati General Hospital, and Persahabatan General Hospital. All hospitals are teaching hospitals. The characteristics described in the study include patient's age, BMI, and baby's birthweight. The mean age of patients in this study was 26.6 years old. Waldenstrom, et al. found that delivery in women aged over 25 years increases the risk of OASIS, which is one of the main risk factors for FI [6,7]. Jha et al. also found that increasing age is correlated with an increased risk of OASIS, with age over 40 years old being the cut-off point [8]. This can be explained by the stiffening of the perineum along with aging which increases the risk for perineal tear [9].

In this study, the mean BMI was 24.8 kg/m². Although the relationship between obesity and OASIS remains controversial, obesity could be linked to an increment of baby's birthweight (macrosomia), thus increasing the risk of OASIS. On the other hand, Kapaya, et al. found that BMI over 30 kg/m² decreases the risk of OASIS by more than 50 % (Odds Ratio [OR] 0.4; 95 % Confidence Interval [CI] 0.2–0.5) [10]. This was supported by Lindhom, et al.,

who reported that increased fat tissue in obese people increases tissue elasticity, leading to reduction of the risk of tear [10,11]. Another study reported that obese people have higher skin resistance towards tension [12], which could be protective towards OASIS.

Another characteristic described in this study is parity status. Most patients (67.5%) in this study were nulliparous. This finding is in accordance with a previous study conducted in dr. Cipto Mangunkusumo National General Hospital in 2012, in which nulliparity was found to be one of the risk factors for OASIS. This is likely due to the difference in elasticity among nulliparous patients [1].

The median duration of the second stage of labor in this study was 45 min with interquartile range of 40 min. A study by Simic, et al. found that the risk of OASIS increases if the duration of the second stage of labor was prolonged by more than one hour (OR 1.25; 95%CI 1.13–1.38) [13]. Episiotomy, one of the risk factors for OASIS, was identified in 40.6% of this study subjects. Jha, et al. found that mediolateral episiotomy decreases the risk of OASIS [8] although this finding remains controversial among studies. This is likely due to the differences in the methods of episiotomy and the unstandardized length of episiotomy incision [9].

High baby's birthweight (macrosomia) is also one of the risk factors for OASIS. Kapaya, et al. found that a birthweight of more than 4000 g increases the risk of OASIS (OR 2.6; 95%CI 2.0–3.3) [10]. Moreover, use of instruments during delivery (vacuum and forceps) also increases the risk of OASIS. In this study, the majority of patients delivered their babies spontaneously (65.4%). Jha, et al. found that forceps extraction increases the risk of OASIS by up to 3 times (OR 3.12; 95%CI 2.42–4.01) [8]. Prager et al. also found that vacuum extraction increases the risk of OASIS by more than 2 times (OR 2.3; 95%CI 1.38–3.81) [14]. This could be explained by the greater pressure and traction from the instrumental delivery compared to spontaneous ones, therefore causing disruption in the muscles and nerves at the perineal area [15].

The diagnosis of FI in this study was established by RFIS and we found 3 out of 58 patients (5.2%) with FI after primary repair of OASIS (two patients with FI only and one patient with flatulence and moderate FI). The incidence of FI following primary repair of OASIS varied from study to study with 74% being the highest [3]. This might be caused by several factors, including differences in the study methods. Linneberg, et al. sent a questionnaire to their subjects via post, increasing the likelihood of response, which in turn increased the percentage of FI outcome after primary repair of OASIS [16]. Other studies also included patients that became pregnant after the occurrence of OASIS, which further increases the risk of recurrent OASIS and FI [3,16,17].

In this study, the patients were asked to undergo an ultrasound examination for anal sphincter. However, only 16 patients came, including 1 out of the 3 patients who complained of FI. Most of the patients were unreachable and some had moved out of Jakarta or were living in areas far from dr. Cipto Mangunkusumo National General Hospital where the ultrasound examination was conducted. From 16 patients, there were five (31%) patients who had anal sphincter defects, three patients with EAS defect and two patients with IAS defect. Visscher, et al. performed anal sphincter ultrasound after primary repair of OASIS and found that 40% of the patients had defects on their anal sphincter (EAS/IAS only or both) [18]. A study by Kirss, et al. also found 31% failure rates in the primary repair of OASIS. They reported that factors, such as the lead surgeon ($p < 0.001$), repair performed during on-call hours ($p = 0.039$), as well as the type of analgesics administered ($p = 0.003$) might be correlated to the failures. Administration of antibiotics and laxatives was associated with treatment success ($p < 0.001$) [19].

This study found that all five patients with sphincter defects had no FI or other pelvic floor problems. There was one patient with FI that came to ultrasound examination but we found no sphincter defect. This finding is in accordance with a study by Guzman, et al. which reported that only 18% of patients with EAS defect and 29% of patients with IAS defect suffered from FI [20]. In addition, Murad-Regadas, et al. also found that not all FI patients had anal sphincter defect at follow-up. They investigated the defects on pubovisceral and anal sphincter muscles from 84 patients with FI and found that 21 (25%) patients had no defects on both muscles [21]. This finding could be explained with the pathophysiology of FI, which was influenced not only by EAS or IAS but also by other structures such as anal cushion, levator ani muscles, as well as nervous system in perineal or anal region [22].

This study provided the basic information for the incidence of FI after primary repair of OASIS at three tertiary hospitals in Jakarta, Indonesia. Furthermore, since the study was conducted in teaching hospitals, the diagnostic methods and repair techniques for OASIS were standardized. Those who conducted the examination (diagnosis) and repair had undergone training and tests. However, this study had several limitations, including high lost to follow-up number since almost all patients were referred and did not reside near the study site; the possibility of recall bias since this is a retrospective study; and the questionnaires were given at the same time for all patients that had OASIS in 2014–2016. In addition, this study only had small sample size for FI and OASIS repair failure so it might not be representative for the general population in Jakarta.

Conclusion

The incidence of OASIS varies from center to center and it might be influenced by patients' characteristics, e.g. age, parity status, baby's birthweight, delivery method, and duration of the second stage of labor. FI outcome may also vary, depending on the risk factors existing in the population. The complaint of FI itself is not always accompanied by anal sphincter defects. This study found that the incidence of FI after primary repair of OASIS was 5.2%; however, it might not represent the general population in Jakarta due to high loss to follow up. Therefore, it is necessary to conduct further studies with larger sample size.

Declaration of Competing Interest

The authors declare that they have no known competing financial interest or personal relationships that could have appeared to influence the work reported in this paper.

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