

# Water Stream in Bidet Toilet Commode as a Cause of Anterior Anal Fissure: A Case-Control Study

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## Abstract

**Background:** Water used as a single sharp stream in toilet commode for post defecation cleansing is a common practice in several countries across the globe including India. Repeated hitting of the anus by water stream could potentially cause injury to the anal canal epithelium and lead to development of fissure-in-ano. As the water stream is emanating from the backside of the toilet commode, the possible injury, if any, would be on the anterior anal canal.

**Objectives:** The present study aimed at determining whether water stream usage in toilet commodes increased the incidence of anterior fissure-in-ano; this was determined by the incidence of anterior fissure-in-ano the study and control groups.

**Methods:** All consecutive fissure-in-ano patients referring to a colorectal clinic from February 2012 to 2015 were included in the study. The patients were classified as a study group (who were using water stream for cleansing purposes in toilet commodes) and a control group (patients who were not using water stream). The characteristics and location (position) of the fissure-in-ano was noted.

**Results:** In this study, 165 patients were prospectively enrolled. Male/female ratio was 96/69, and the mean age was  $36.3 \pm 11.2$  years. The anterior fissure-in-ano in the study group was 55.9% (47/84), while it was 17.3% (14/81) in the control group ( $P < 0.0001$ , odds ratio: 6.08, 95% CI: 2.96 - 12.47).

**Conclusions:** Water used as a single sharp stream to cleanse after defecation in toilet commodes is hazardous and should be avoided.

**Keywords:** Anal Fissure, Anterior, Cause, Water, Bidet Toilet

## 1. Background

Methods to cleanse the perianal region after defecation vary in different regions of the world. Among them, the 2 major methods are cleansing with tissue paper (dry cleaning) or washing with water (wet cleaning) (1). Weather, religious beliefs, and easy availability of water/paper have made people to choose one practice over the other. Once a method has been used for a long time, then, it would become a habit and part of a culture. Each method has its own advantages and disadvantages.

Water usage in toilet commodes may pose potential health hazards (1-3). Conventionally over the centuries, water was poured from a container for post defecation cleansing purpose. However, in the last 3 decades, several new methods have come in vogue, which are more convenient. These include water emanating as a single stream from a nozzle at the backside of the commode (Figure 1), hand-held showers and recently, the Japanese have manufactured high-end electronic units that have precise, narrow water streams and come with built-in air dryers.

When used as a single stream (Figure 1), water stream

in toilets commodes could cause damage to the lining of the anterior anal canal, thereby increasing the risk of development of fissure-in-ano. Logically, the fissure caused by a water stream coming from posterior (back) side of the commode would cause an anterior fissure (on front side of anal canal). This study was designed to confirm this and to quantify the associated risks, if any.

## 2. Objectives

The present study aimed at analyzing whether the usage of water stream in toilet commodes increased the incidence of anterior fissure-in-ano in the population and comparing it to the existing incidence of anterior fissure-in-ano in the population.

## 3. Methods

All consecutive fissure-in-ano patients referring to a colorectal clinic from February 2012 to 2015 were included in the study. The study was done at Indus super specialty



**Figure 1.** Water Emanating as a Single Stream form a Nozzle at the Back End of the Toilet Commode

hospital, Mohali, India. The ethics committee of the hospital approved this retrospective case-control study.

The following parameters were noted on medical history: duration of symptoms, presence of pain (piercing/cutting, throbbing and/or burning), associated bleeding per rectum, recent delivery within last one year, and using water stream in bidet toilets. On examination, location of fissure and associated features of chronic fissure (induration, thickened edges, and sentinel pile) were noted. The patients were classified into a study group (those using water stream for cleansing purposes in toilet commodes) and a control group (those patients who were not using water stream). The assessment in all the cases was done by a single surgeon (PG).

The patients were excluded if there was any evidence of fissure-in-ano caused by Crohn's disease, sepsis, immunosuppression, or history of anal intercourse.

### 3.1. Sample Size Calculation

The incidence of anterior fissure in the population is 1% to 10%. The incidence of anterior fissure in the population

using water stream in bidet toilets (study group) has been shown to be much higher although the exact incidence is not known; it was assumed to be at least 20%. Therefore, considering the incidence of 20% and 5% in the study and the control groups, alpha error of 0.05, beta error of 0.2, and power of 0.8, the sample size was calculated to be 150 (75 patients in each group).

### 3.2. Statistical Analysis

Categorical outcomes were analyzed using Fisher exact test or Chi-square test. All analyses were conducted using SPSS Version 11.5 (Chicago, IL). Odds ratio was used to compare the relative odds of the occurrence of the outcome of interest (occurrence of anterior fissure-in-ano in patients using water stream). P value of less than 0.05 was considered as significant.

## 4. Results

In this study, 165 patients were retrospectively enrolled. Male/female ratio was 96/69. The mean age was  $36.3 \pm 11.2$  years. Median follow-up was 27 months (5 - 42 months). The chronic fissure was present in 129 (78.2%), acute in 3 (1.2%), and acute-on-chronic in 33 (20%) patients. The main symptom was cutting or piercing pain in 148 (89.7%), throbbing in 28 (16.9%), and burning in 61 (36.9%) patients. Bleeding was present in 16 (9.7%) and the sentinel pile was present in 25 (15.2%) patients. The fissure was present after delivery in 11 (6.7%) patients. In the control group (n = 81 patients), posterior fissure was present in 67, both (anterior and posterior) fissure was present in 4, and anterior fissure was present in 10 patients. In the study group, (n = 84 patients), posterior fissure was present in 37, both anterior and posterior fissures were present in 17, and anterior fissure in 30 patients. The anterior fissure was present in 14 out of 81(17.2%) patients in the control group, while it was present in 47 out of 84 patients (55.9%) in the study group (Table 1).

**Table 1.** Location of Anterior Fissure-in-ano in the Study and Control Groups

|                                   | Patients with Chronic Fissure Using Water Stream in the Bidet-Toilet (Study Group) (n = 84) | Patients with Chronic Fissure not Using Water Stream in the Bidet Toilet (Control Group) (n = 81) | Significance   |
|-----------------------------------|---|---|--|
| <b>Anterior fissure incidence</b> | 47 (55.9%)  | 14 (17.2%)  | (P < 0.0001)<br>odds ratio: 6.08,<br>(95% CI: 2.96 to 12.47) |

Both groups were similar in chronicity of the fissure, age, sex, and symptoms (pain, burning, sentinel pile, and delivery status). However, significant difference was observed in the location of fissure in both groups. The study group (using water stream) had a significantly higher incidence (47/84 - 55.9%) of anterior fissure-in-ano compared to the control group (14/81 - 17.3%) ( $P < 0.0001$ ) [odds ratio: 6.08, 95% CI: 2.96 - 12.47] (Table 1). On subgroup analysis, the risk seemed higher in males ( $P = 0.0001$ , odds ratio: - 8.58) compared to females ( $P = 0.0065$ , odds ratio- 4.27).

All patients in the study group were advised to stop using water stream. They were recommended to pour water from a container or use a hand shower. All the patients except one responded well to stopping the usage of water stream and the usual conservative management.



**Figure 2.** Anterior Fissure-In-Ano Developed Due to Water Jet Stream in a Bidet Toilet Commode

## 5. Discussion

The practice of water and tissue paper usage after defecation dates back to several centuries and varies in different countries and cultures. Apparently, China had started using toilet paper for centuries before it appeared in Europe (2, 3). In 851 AD, during the Tang Dynasty (618 - 907 AD), an Arab travelling through China wrote about the Chinese people, "They do not wash themselves with water when they have done their necessities, but they only wipe themselves with paper." Joseph Gayetty (3) invented the tissue paper in 1860 in the USA. However, water has been used for post defecation cleaning in numerous regions of the world for several centuries (2); and its use has been documented in Europe (France, Italy, Albania, Croatia, Hungary, Slovenia, Czech Republic, Malta, and Greece), the Middle East (Turkey, Armenia, Iran, Iraq, Kuwait, Saudi Arabia, Qatar, the UAE, Turkey, Lebanon, Palestine, Syria, and Jordan), and Asian countries (Indian subcontinent, Japan and Korea) (2, 4, 5). Marc Andre Jacoud invented the bidet (a device that

makes it easy to clean oneself with water) in 1708 in France (2, 3).

A toilet commode or bidet may have a nozzle attached to the backside as a stream of water from the nozzle cleans the anal region after defecation (Figure 1). This water stream can at times have high pressure. Otherwise, long-term exposure of anal canal to such water stream even with normal pressure can potentially cause injury to anal mucosa. As expected, such an injury would be expected on only anterior anal canal as the water stream is projected from behind. As per literature, anterior fissure-in-ano is not common. It accounts for only 10% of all fissures in females and 1% of fissure-in-ano in males (6-8). However, using water stream in bidet toilet could increase this incidence. We found the incidence of anterior fissure-in-ano to be significantly higher ( $P < 0.0001$ ) in the group using water stream than in the control group (55.9% vs. 17.2%, respectively). It was also much higher in the control group than the usual incidence of anterior fissure-in-ano (5% - 15% of all fissure-in-ano) (6-8). In the present study, using water stream increased the odds risk of developing an anterior fissure by 6.08 times (95% CI: 2.96 to 12.47).

The increased incidence of development of anterior fissure-in-ano with water stream has been reported previously (9), but its impact has not been quantified. Water stream, when used persistently especially with force, can cause tears in solid surfaces including stone. In fact, water stream is being used commercially to cut wood, stone, and even metal (10).

All except one patient responded well to cessation of water stream usage and conservative management. Considering a significantly ( $P < 0.0001$ ) higher incidence of anterior fissure-in-ano in water stream usage group (55.9%) compared to normal control group (17.2%), the cause and effect relationship seemed highly probable. This fact and the near complete response to cessation of water stream usage point out to causative role of water stream in bidet toilet for anterior fissure-in-ano. Therefore, the use of water stream in bidet toilet commodes should be discouraged.

Further long term studies would substantiate this fact.

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## Footnotes

**Authors' Contribution:** Study concept and design: Pankaj Garg; analysis and interpretation of data: Pankaj Garg and Pratiksha Singh; drafting of the manuscript:

Pankaj Garg and Pratiksha Singh; critical revision of the manuscript for important intellectual content: Pankaj Garg and Pratiksha Singh; statistical analysis: Pankaj Singh.

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**Implication for Health Policy Makers/Practice/Research/Medical Education:** Water used as a single sharp stream to cleanse after defecation is used in bidet toilets in several countries of Asia. The present study clearly demonstrates that using water as a single sharp stream after defecation significantly increases the risk of anterior fissure-in-ano. This practice is clearly hazardous and should be avoided. Water shower may be safer.

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