



Reflex anal dilatation: An observational study on non-abused children



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ABSTRACT

Objectives: Reflex anal dilatation (RAD) is considered as a possible sign of anal abuse, however studies evaluating its prevalence in non-abused children are limited. The aim of this study was to evaluate the prevalence of RAD in a convenience sample of children with no suspicion of abuse admitted to a Pediatric Emergency Department (PED).

Methods: Prospective observational study including children admitted to the PED of Padova, Italy, between January and June 2011. Patients with no suspicion of abuse and for whom ano-genital examination was part of their medical evaluation were included. Children were excluded if in critical clinical conditions or if any suspicion of abuse arose during medical evaluation. Presence/absence of RAD and of factors favoring its appearance were recorded for each patient.

Results: Two-hundred and thirty children (median age of 12 months, interquartile range 5–35 months) were finally included. A positive RAD was reported in 14 (6.1%, CI 95% 3.4–10). Only 3 patients (1.3%, CI 95% 0.3–3.7) showed a positive RAD in the absence of any predisposing factor.

Conclusions: RAD is an infrequent sign in non-abused children and it is particularly rare in the absence of any predisposing factor. Case-control studies are necessary to better clarify its diagnostic relevance.

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1. Introduction

Sexual abuse in childhood is a widespread phenomenon: data published by the World Health Organization in 2006 estimates that 150 million girls and 73 million boys under 18 have experienced sexual intercourse or other forms of sexual violence [1]. According to the study carried out by Hobbs and Wynne, child anal abuse represents 29% of sexual abuse in girls and 83% in boys, and the majority of this kind of maltreatment involves children aged between 0 and 5 years old [2]. Unfortunately, signs with high specificity are few and rarely found also in abused patients, so the diagnosis is often challenging.

Reflex anal dilatation (RAD) is currently considered as a possible sign of anal abuse. It is a dynamic phenomenon of relaxation of both the external and the internal anal sphincters leading to such dilatation that the examiner may see into the rectum [3]. Some relevant studies [2,4,5] documented its presence in victims of buggery, the first one being a landmark paper by Chris Hobbs and Jane Wynne published in 1989, finding a prevalence of RAD of approximately 40% in children with ascertained sexual abuse.

In 2008 the Royal College of Paediatrics and Child Health affirmed that “Evidence indicates that reflex anal dilatation is associated with a disclosure of anal abuse and has been reported in sexually abused children [...]” while “It has not usually been reported in children selected for non-abuse” [6]. In the same document they affirmed that “If RAD is seen, sexual abuse should always be considered in the context of the history, medical assessment and other anogenital signs”. These statements were confirmed in the update published in 2011 [7].

In her paper, JA Adams classified RAD with an antero-posterior diameter of more than 2 cm as an “Indeterminate sign” of anal abuse. It means that, even if there are insufficient or conflicting data from research studies and no expert consensus on it, the sign may support a child’s disclosure and may induce to contact child protective services in some cases. The author underlined that “medical providers who examine children” with suspected sexual abuse “need to be aware of published research on findings in non-abused children [...]” [8].

Finally, a retrospective blinded study published in 2013 by some of the main experts on child abuse, Myhre and JA Adams, demonstrated that “total anal dilatation was significantly associated with anal penetration ($p = 0.000$)”, as showed by the bivariate comparison of its prevalence between children with and without probable anal penetration. The results of the study suggested that

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“total anal dilatation is potentially an important finding” even if “it is too early to upgrade the finding into highly suggestive for anal abuse”. These statements underline the persistent interest for the sign in the diagnosis of anal abuse in children [9].

Only few studies evaluating the prevalence of RAD in nonabused children have been carried out and presented relevant limitations such as the lack of a precise definition of a positive RAD, a small sample size, a limited age range of included children or the selection of patients presenting specific clinical conditions, like constipation or other favoring factors [10–16].

The aim of the present study was to evaluate the prevalence of RAD in a convenience sample of children with no suspicion of abuse admitted to a Pediatric Emergency Department (PED).

2. Patients and methods

This is an observational prospective study including a convenience sample of children admitted to the PED of Padova, Italy, between January and June 2011. Children presenting the following criteria were included in the study: (1) no suspicion of sexual abuse; (2) children for whom ano-genital examination was part of their routine medical evaluation. Exclusion criteria were: (1) previous referral to the hospital for allegation or suspicion of abuse and patients presenting ano-genital findings considered as significantly suspicious for abuse according to JA Adams' paper of 2011 (we excluded patients presenting one or more signs reported among “Findings diagnostic of trauma and/or sexual contact” in JA Adams' table, unless a clear, timely and plausible description of accidental injury was provided) [8] and/or suspicious data collected from the medical history; (2) positive RAD and subsequent suspicion of abuse at follow-up evaluation (3) critical clinical conditions at presentation.

Information collected for each patient included demographic data (sex, age, nationality) as well as clinical data (the presence/absence of RAD, the presence/absence of favoring factors for the appearance of RAD according to the literature). Physicians working in the PED were trained to evoke RAD by gently parting the buttocks with both hands and simply observing the anal region for 30 s, with patient laying in the prone knee-chest position, in the left-lateral position or supine lifting his legs up, indifferently. Training of medical staff was carried out through: (1) three dedicated teaching sessions; (2) teaching material (including photographic material) available in the PED; (3) availability of 2 study investigators for supervision of all patients presenting a positive RAD and for any other case when deemed necessary by the physician in charge of the patient. Each of the physicians involved in the data collection observed the study investigators for the first 10–15 visits in order to uniform the method of detection and recognition of the sign. RAD was considered as positive when both the external and the internal anal sphincters dilated showing the rectal mucosa within 30 s. Constipation, which is the most frequent favoring factor [14,15], was defined as the lack of defecation for 2 and 3 days or the evacuation of hard faeces or as the presence of palpable stools in the abdomen. To check the presence of these findings parents were asked about their child's bowel habits and an accurate abdominal examination (both superficial and deep palpation of the abdomen) was performed by the physician in charge of the patient. The presence of other predisposing conditions (encopresis, sedation, anesthesia [8], spinal diseases [16], inflammatory bowel diseases [17], digital rectal examination, use of suppositories or enemas [2]) was also recorded. Enemas, suppositories and digital rectal examinations were considered as favoring factors only when performed in the 24 h prior to medical evaluation. All data collected, both demographic and clinical, were recorded on the PED patient's chart and the presence or the absence of RAD was recorded in the

ano-genital part of the physical examination. The researchers then checked all the patients' charts and looked for those reporting information about RAD. All charts were reviewed in order to determine which cases met the inclusion criteria or exclusion criteria for the study. Then all the data were entered into an electronic database.

Children with positive RAD were followed-up by contacting their Primary Care Physician at 3 months from discharge to verify if any suspicion of abuse has emerged during that period. Monitoring of return visits to the PED was also performed in order to identify possible subsequent elements of suspicion for abuse.

3. Statistical analysis

Categorical variables were expressed as percentages and 95% confidence intervals (CI) were reported for main results. Quantitative variables were expressed as median and interquartile range (IQR), due to non-normal data distribution. Comparison of categorical variables was performed by means of χ^2 test, while Mann–Whitney Test was used for comparing quantitative variables. Parameters displaying $p \leq 0.05$ were considered statistically significant.

Statistical analyses were conducted using the statistical program MedCalc 11.1.

All the procedures were performed in compliance with institutional guidelines and the Internal Review Committee has approved them. The privacy rights of human subjects was observed.

4. Results

The number of patients screened for RAD was 230. Each of them corresponded to the inclusion criteria and did not present any characteristic to be excluded from the sample. So the study finally included 230 patients, 117 girls (51%) and 113 boys (49%), aged between 8 days and 12.6 years (median age 12 months, IQR 5–35 months). Eighty-eight percent of the sample were children younger than 5 years old. One hundred and seventy-four children (76%) were Italian, while 56 (24%) had a different nationality (24 African, 22 from East Europe, 9 Asian and 1 from South America). Chief complaints at presentation of included children are reported in Table 1. None of the 230 children presented any exclusion criteria, therefore they were all included in the sample.

RAD was found in 14 patients, which represented 6.1% of the population (CI 95%, 3.4–10%). All of these 14 cases were reassessed by one of the study investigators and each of them was confirmed to present a positive RAD. Of these, 10 (71%) were girls and 4 (29%) were boys, with no significant difference in distribution compared to children with negative RAD ($p = 0.19$). The median age of children with positive RAD was 36 months (IQR 15–84 months), which resulted significantly higher compared to the group with negative RAD (median age 11 months, IQR 5–32 months, $p = 0.002$).

Table 1
Chief complaints of included children.

Chief complaints	N	%
Constipation and/or encopresis	40	17.4
Abdominal pain	31	13.5
Bloody stools	13	5.6
Anal or perianal itching/pain (suspected parasitosis)	6	2.6
Dysuria	18	7.8
Ascertained accidental genital trauma	4	1.7
Genital pain/swelling (suspected dermatitis)	13	5.6
Other ^a	105	45.7
Total	230	100

^a Include children wearing diaper for whom ano-genital evaluation was carried out as part of the routine complete medical evaluation.

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