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ORIGINAL ARTICLE

Vaginal bleeding in children: A retrospective audit at a tertiary paediatric gynaecology service

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Aim: The aim of this study was to describe the clinical features and investigations of vaginal bleeding in prepubertal children.

Methods: We performed a retrospective case series of children under the age of 10 who presented with vaginal bleeding to our institution between 2018 and 2019.

Results: There were 32 cases identified during the timeframe, with a mean age of 5.5 years (standard deviation 3.2 years, range 5.5 days to 9.6 years). Vulvovaginitis was the most common diagnosis ($n = 12$, 37.5%), followed by precocious puberty ($n = 5$, 15.6%). Uncommon but serious causes were vaginal rhabdomyosarcoma ($n = 1$), and sexual abuse (one patient presenting with gonorrhoea and one with a non-accidental injury). Vaginoscopy was performed in nine patients (28.1%) for various reasons, and a vaginal foreign body was identified in two patients (6.3%). All the patients who had a serious cause of bleeding (neoplasm or sexual assault) or who required specific treatment (precocious puberty, lichen sclerosus, urethral prolapse) presented with red flags on history and/or examination: recurrent episodes of vaginal bleeding, heavy bleeding, associated general symptoms (poor feeding and growth), presence of thelarche, abdominal mass, associated profuse vaginal discharge and abnormal genital examination (skin changes, urethral prolapse or protruding mass from the vagina).

Conclusions: A thorough history-taking and clinical examination aiming at identifying red flags may help to discriminate between benign causes of vaginal bleeding, where no further investigations are indicated, and alternative diagnoses with a poor outcome and/or requiring specific treatment and additional investigations.

Key words: precocious puberty; prepubertal vaginal bleeding; vulvovaginitis.

What is already known on this topic

- 1 Prepubertal vaginal bleeding is the presenting symptom for a wide range of conditions, including benign and self-resolving diagnoses but also for sinister causes such as malignancy and sexual abuse.
- 2 Distinguishing between these aetiologies is challenging for the clinician.
- 3 Guidelines on management of prepubertal vaginal bleeding from professional societies are lacking.

What this paper adds

- 1 Our case series emphasises the importance of history-taking and clinical examination in the management of prepubertal vaginal bleeding.
- 2 Presence of red flags (recurrent episodes of vaginal bleeding, heavy bleeding, associated general symptoms, thelarche, abdominal mass, associated profuse vaginal discharge and abnormal genital examination) should lead to further investigation in order to appropriately identify and treat patients with a serious condition or those requiring a specific treatment.
- 3 In the presence of features consistent with vulvovaginitis and absence of any red flags, it is reasonable to manage conservatively without additional investigations, and follow the patient.

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Vaginal bleeding in prepubertal girls is an uncommon presentation which can cause significant anxiety for the family. Aetiologies include various conditions such as hormonal withdrawal bleeding, vulvovaginitis, urethral prolapse, vaginal foreign body, dermatological conditions, injury and precocious puberty, but also sinister causes such as malignant masses and sexual abuse.^{1,2} It had been suggested in the past that all prepubertal vaginal bleeding necessitated an examination under anaesthesia (EUA),³ but this statement has been increasingly challenged.^{2,4} Research on vaginal bleeding

in prepubertal children is limited to case reports of unusual causes^{5–8} and case series, of which only three are recent^{9–11} while the rest were published several decades ago.^{3,12–14}

Optimal management should aim at identifying conditions with a poor outcome or requiring a specific treatment, and avoiding over-investigating benign and self-resolving conditions. Distinguishing between this wide range of diagnoses may be challenging for the clinician, and guidelines on appropriate investigation from professional societies are lacking.

The aim of this study was to review presentations, investigation, diagnoses and management of vaginal bleeding in prepubertal children presenting to our institution.

Methods

Study setting

Our service is part of a tertiary paediatric hospital and is the main referral centre for paediatric gynaecology for an area with approximately 6 million inhabitants. An experienced paediatric gynaecologist is on call daily, including after-hours. Patients need to be referred to our service, either by their general practitioner, a specialist or the emergency department.

Study design

This study was a retrospective case series. Inclusion criteria were children aged under 10 years old, presenting with vaginal bleeding to our paediatric gynaecology department between April 2018 and April 2019. The age limit of 10 was chosen to exclude patients with normal pubertal development. Cases were excluded if the bleeding was in the context of a known straddle injury, or if the patient had a pre-existing diagnosis of precocious puberty prior to onset of vaginal bleeding.

Cases were identified among the service database, based on diagnosis code for prepubertal vaginal bleeding. Data were extracted from electronic medical records for: age, presenting symptoms (including description of bleeding, vulval itch and vaginal discharge), past medical history, thelarche, external genital examination, investigations, treatment and outcome. Bleeding was described in terms of isolated or recurrent episodes. The estimated amount of bleeding was classified into: scant, small fresh, moderate or heavy, based on the description documented in the clinician's notes. The medical records were searched for introital swab results, pelvic ultrasound findings, blood results (including haemoglobin, follicle-stimulating hormone, luteinizing hormone, oestradiol, prolactin, thyroid-stimulating hormone, ovarian tumour markers), X-ray bone age and cerebral magnetic resonance imaging. Operation reports were analysed if the patient had undergone EUA, and histopathology reports of biopsies were obtained where available.

Statistical analyses

Categorical data were reported as number and percentage, and continuous data as mean and standard deviation. The Fisher exact test was used for comparison of categorical parameters.

Ethics

This project received ethical approval by the local Human Research Ethics Committee (QA/59661/RCHM-2019).

Results

There were 32 patients under the age of 10 presenting for vaginal bleeding to our service within the specified timeframe. Referrals came from the emergency department ($n = 18$, 56.3%), general practitioners ($n = 10$, 31.3%), paediatricians ($n = 3$, 9.4%), and general gynaecologists ($n = 1$, 3.1%).

The mean age at presentation was 5.5 years old (standard deviation 3.2 years) and ranged from 5 days to 9.6 years.

Table 1 outlines presentations, investigations, results and diagnoses. The most common cause of vaginal bleeding was vulvovaginitis ($n = 12$, 37.5%). Other causes for vaginal bleeding were as follows: precocious puberty ($n = 5$, 15.6%), unexplained ($n = 3$, 9.4%), foreign body ($n = 2$, 6.3%), maternal hormonal withdrawal ($n = 2$, 6.3%), spontaneous dominant follicle ($n = 2$, 6.3%), urethral pathology ($n = 1$, 3.1%), lichen sclerosus ($n = 1$, 3.1%), vaginal rhabdomyosarcoma ($n = 1$, 3.1%), non-accidental injury ($n = 1$, 3.1%), gonorrhoea ($n = 1$, 3.1%) and high impact trauma without straddle injury ($n = 1$, 3.1%). One patient had both vulvovaginitis and a vaginal foreign body.

Pelvic ultrasound was performed in 19 patients (59.4%) and blood tests in 15 cases (46.9%). Vaginoscopy was performed in 9 cases (28.1%), 4 of whom had biopsies. Two girls had a foreign body diagnosed on vaginoscopy. In both cases, the foreign body was a small piece of toilet paper.

Of the patients diagnosed with vulvovaginitis, 9 of 12 (75%) presented with only scant bleeding, compared with 4 of 20 (20%) of girls who had other diagnoses, and this difference was statistically significant ($P = 0.0035$). The other feature significantly associated with a diagnosis of vulvovaginitis was the presence of vulval itch, which was documented in 9 of 12 (75%) girls with vulvovaginitis versus 2 of 20 (10%) girls without vulvovaginitis ($P = 0.0003$). The two patients who complained of vulval itch without evidence of vulvovaginitis were diagnosed with gonorrhoea and lichen sclerosus. In both cases, the patient had other significant features raising the suspicion for an alternate diagnosis. The patient with gonorrhoea presented with scant bleeding, vulval itch, but also profuse malodorous vaginal discharge and sexualized behaviour. The child with lichen sclerosus had features consistent with this diagnosis on external genital examination, including white plaques and fissuring of the vaginal fourchette.

Of the 12 children diagnosed with vulvovaginitis, three (25%) underwent an EUA because of recurrent bleeding. This revealed a vaginal foreign body (toilet paper) in one of these girls, while in the others no foreign body was identified. All patients with vulvovaginitis were managed with simple vulval care measures including recommendations for use of cotton underwear, vinegar baths, barrier cream and avoidance of local irritants in accordance with local hospital advice. Nine patients attended for follow-up and all reported that symptoms had resolved with these measures. The other three children were lost to follow-up.

Precocious puberty was the second most common diagnosis, present in five girls. All had breast tissue present compared to

Table 1 Demographic, presentation, investigations, results and diagnoses of patients

Case	Age (years)	Presentation	Vulvar itch	Amount of bleeding	Breast tissue	Ultrasound	Blood results	EUA	Diagnosis
1	5 days	Blood in nappies in a newborn	No	Fresh small	No	Not performed	N/A	No	Maternal hormonal withdrawal
2	9 days	Blood in nappies in a newborn	No	Fresh small	No	Not performed	N/A	No	Maternal hormonal withdrawal
3	0.8	Small fresh blood in nappies	No	Small fresh	No	2 right ovarian follicles, normal center ovary normal, thin endometrium	N/A	No	Functional ovarian follicle
4	1.2	Heavy fresh bleeding in nappies	No	Heavy	No	Normal	Hb 88, plt normal, FSH 2.3, LH <0.2, E2 18, normal prolactin and VWB	Yes	Non-accidental injury
5	1.3	Protruding vaginal lump, abdominal mass, blood in nappies, poor feeding and growth	No	Fresh small	No	31 × 15 × 26 mm mass 2/3 upper vagina, normal cervix and uterus	FBE normal, UEC normal, LFT normal, AFP normal, b-hCG normal	Yes	Vaginal rhabdomyosarcoma
6	1.5	Two episodes of bright red spotting and brown discharge	No	Fresh small	Yes	Bicornuate uterus, otherwise normal	FSH 2.6, LH 5.8, E2 129, b-hCG normal, AFP normal, inhibin B normal, LDH 704, prolactin 2535, TSH and T4 normal	Yes	Central precocious puberty from intracranial mass
7	1.8	Blood in nappies	No	Scant pink	No	Normal for age	N/A	No	Unexplained
8	2.1	Spotting	No	Fresh small	No	Left ovarian follicle 5 × 5 mm	Normal	No	Unexplained
9	3.0	Light vaginal bleeding associated with malodorous green discharge and vulval itch	Yes	Scant	No	Not performed	N/A	No	Vulvovaginitis
10	3.5	One episode of fresh blood	No	Small fresh	No	Normal for age	N/A	No	Unexplained
11	3.5	Bright red blood in underwear	No	Small fresh	Yes	Normal for age, prepubertal uterus and ovaries	E2 28, FSH 1.5, LH <0.2, prolactin normal	Yes	Precocious puberty
12	4.1	Recurrent vaginal bleeding associated with malodorous discharge and vulval itch	Yes	Small fresh	No	Normal for age	N/A	Yes	Vulvovaginitis
13	5.1	Vaginal bleeding associated with yellow discharge and vulval itch	Yes	Scant	No	Not performed	N/A	No	Vulvovaginitis
14	5.6	Vaginal bleeding associated with malodorous discharge and vulval itch	Yes	Scant	No	Not performed	N/A	No	Vulvovaginitis
15	5.6	3–4 days of vaginal bleeding in underwear	No	Moderate	Yes	Right ovarian dominant follicle 24 mm	E2 95, LH < 0.2, FSH 0.7, coagulation normal, FBE normal, TSH and T4 normal	No	Spontaneous dominant follicle
16	5.9	Vaginal bleeding associated with yellow discharge	No	Scant	No	Not performed	N/A	No	Vulvovaginitis
17	6.1	Scant vaginal bleeding on wiping, associated with vulval itch	Yes	Scant	No	Not performed	N/A	No	Vulvovaginitis
18	6.3		Yes	Scant	No	Not performed	N/A	No	Gonorrhoea

(Continues)

Table 1 (Continued)

Case	Age (years)	Presentation	Vulvar itch	Amount of bleeding	Breast tissue	Ultrasound	Blood results	EUA	Diagnosis
		Profuse vaginal bleeding and white malodorous discharge, associated with vulval itch and sexualized behaviour							
19	6.5	Pink discharge on wiping, associated with vulval itch	Yes	Scant pink	No	Normal for age	FBE normal, E2 20, FSH 1.3, LH <0.2, TSH and T4 normal	No	Vulvovaginitis
20	6.9	2 months vaginal bleeding and vague vulval pain	No	Small fresh	No	Normal for age	FSH 4.9, LH <0.2, E2 < 44, prolactin normal	Yes	Vaginal foreign body (toilet paper)
21	7.9	2 days of spotting in underwears	No	Small fresh	No	Normal for age	N/A	No	Vulvovaginitis
22	8.0	4–5 days bleeding like a light period	No	Small fresh	Yes	Normal for age	LH 0.3, FSH 1.4, E2 < 18	No	Precocious puberty
23	8.3	Recurrent episodes of vaginal bleeding and vulval itch	Yes	Fresh small	No	Not performed	N/A	Yes	Lichen sclerosus
24	8.4	One episode of spotting for 1 day	No	Scant	No	Normal for age	E2 <18, FSH 2.2, LH <0.2	No	Unexplained
25	8.6	Small fresh red bleeding on underwear and vulval itch	Yes	Small fresh	No	Normal for age	CRP <5, LH <0.2, FSH 2.2, E2 <18, FBE normal	Yes	Vaginal foreign body (toilet paper) and vulvovaginitis
26	8.9	Recurrent episodes of spotting on wiping and vulval itch	Yes	Scant	No	Normal for age	N/A	No	Vulvovaginitis
27	8.9	Cyclical episodes of bleeding for 2–3 days every month for the last 8 months	No	Small fresh	Yes	Normal, prepubertal uterus and ovaries	E2 51, FSH 3.3, LH <0.2, normal prolactin	No	Precocious puberty
28	9.0	Daily spotting for several months	No	Scant	No	Normal for age	E2 <18, LH <0.2, FSH 1.0, prolactin normal, FBE normal, TSH and T4 normal	Yes	Vulvovaginitis
29	9.0	Small fresh bleeding in setting of trauma (witnessed fall from 2 m height) with fractured clavicle	No	Small fresh	No	Normal for age	N/A	No	High impact trauma
30	9.1	Several episodes of vaginal bleeding and vulval itch	Yes	Scant pink	No	Normal for age	N/A	No	Vulvovaginitis
31	9.4	Bright red vaginal bleeding for 4 days	No	Fresh small	Yes	Did not perform the requested US	E2 111, FSH 3, prolactin normal	No	Precocious puberty
32	9.6	Several episodes of small vaginal bleeding, with reddened lesion noted by the parents	No	Scant	No	Not performed	N/A	No	Urethral prolapsus

AFP, alpha-fetoprotein; b-HCG, beta human chorionic gonadotrophin; E2, estradiol, pmol/L; EUA, examination under anaesthesia; FBE, full blood examination; FSH, follicle-stimulating hormone, IU/L; Hb, haemoglobin, g/L; LDH, lactate dehydrogenase, IU/L; LFT, liver function test; LH, luteinizing hormone, IU/L; N/A, not applicable; Plt, platelets; Prolactin, mIU/L; TSH, thyroid-stimulating hormone; UEC, urea, electrolytes and creatinine; US, ultrasound; VWB, von Willebrand.

none of the girls who had a diagnosis other than precocious puberty ($P = 0.00002$). Compared with other causes of bleeding, precocious puberty was significantly associated with fresh bleeding compared to scant bleeding ($P = 0.0238$). Three patients were investigated with cerebral magnetic resonance imaging brain, for whom the results were normal in two, and the other (case 6) had a hypothalamic hamartoma as a cause of her central precocious puberty. She was referred to the endocrinology department and managed with gonadotrophin-releasing hormone agonist.

Two patients were diagnosed with a spontaneous dominant ovarian follicle in the absence of evidence of precocious puberty. The first patient (case 3) had two episodes of vaginal bleeding within a 2-week interval. At follow-up 2 months later, she had not experienced any recurrence of vaginal bleeding and did not undergo any additional imaging. The second patient (case 15) had two episodes of vaginal bleeding in a 2-month interval. She had multiple ultrasounds, showing a progressive reduction in size of the ovarian follicle, and a complete resolution at 6 months.

One patient (case 5) aged 1.3 years old was diagnosed with vaginal rhabdomyosarcoma. She had presented with a protruding vaginal lump, fresh vaginal bleeding, poor growth and poor feeding. The pelvic ultrasound showed a mass in the upper vagina, and the diagnosis was confirmed on biopsies performed at vaginoscopy.

Two cases of sexual abuse were identified in this series. In addition to the 6-year-old patient described above who presented with gonorrhoea, there was a case of non-accidental injury (case 4) in a 14-month-old infant who presented with heavy vaginal bleeding and haemoglobin drop to 88 g/L. EUA demonstrated upper vaginal laceration.

Two term newborn infants aged less than 10 days old were diagnosed with maternal hormonal withdrawal, based on timing related to delivery. They were managed conservatively and bleeding resolved spontaneously.

Urethral prolapse was identified in a 9-year-old patient who presented with recurrent episodes of small amounts of vaginal bleeding. Treatment with topical oestrogen was initiated but the patient did not attend follow-up.

Discussion

Vaginal bleeding in prepubertal children can cause anxiety for both patients and parents, and the causes range from minor and treatable conditions such as vulvovaginitis, to sinister causes including malignancy and sexual assault. Due to the relatively uncommon nature of the presentation, there is a lack of robust, evidence-based guidance on the appropriate investigation of these patients. There is a risk of over-investigating a trivial cause of bleeding, leading to unnecessary procedures. On the other hand, serious causes such as malignancy and sexual assault, or those requiring more targeted treatment, must not be overlooked as delayed investigation and treatment may lead to poor outcomes.

This case series highlights the importance of thorough history-taking and careful clinical examination, which can lead to the correct diagnosis in a large proportion of the cases and discriminate whether additional investigations are necessary.

All the patients who had a serious cause of bleeding (malignancy or sexual assault) or who required specific treatment

Table 2 Red flags for serious causes of vaginal bleeding or causes requiring a specific treatment

Red flags for serious causes of vaginal bleeding or causes requiring a specific treatment

1. History
 - Recurrent episodes of vaginal bleeding
 - Heavy vaginal bleeding
 - Associated general symptoms (poor feeding and growth)
2. Examination
 - Presence of breast development
 - Profuse vaginal discharge
 - Abnormal genital examination including vulval skin changes, urethral prolapse and protruding mass from the vagina
 - Abdominal mass

(precocious puberty, lichen sclerosus, urethral prolapse) presented with additional symptoms or features identified on history and/or examination. Red flags that we identified were (Table 2): recurrent episodes of vaginal bleeding, heavy bleeding, associated general symptoms (poor feeding and growth), presence of thelarche, abdominal mass, associated profuse vaginal discharge and abnormal genital examination (including vulval skin changes related to features of lichen sclerosus, urethral prolapse and protruding mass from the vagina). The only exception was vaginal foreign body, where one case presented with only small fresh bleeding and vulval itch without additional symptoms.

Vulvovaginitis was the most common cause for vaginal bleeding in our series and was significantly associated with scant bleeding and with vulval itch compared to other aetiologies. None of the patients with vulvovaginitis alone had any red flags. This gives reassurance that patients presenting with a single episode of scant bleeding with features consistent with vulvovaginitis on examination and in the absence of red flags, do not require further investigations and should be managed with conservative vulvovaginitis treatment and appropriate follow-up to ensure resolution of symptoms.

Precocious puberty was also common in our case series and was strongly associated with the presence of breast tissue and fresh bleeding, highlighting the need for careful history and examination, and supporting the restriction of hormone profile bloodwork to girls presenting with these features.

In terms of investigations, pelvic ultrasound was performed in more than half of our patients. Indications for ultrasound were recurrent or persistent vaginal bleeding, fresh or heavy bleeding, or associated symptoms (protruding mass, breast development). In a case series of 17 prepubertal patients with vaginal bleeding, Ng *et al.* reported that all underwent a pelvic ultrasound, which had all normal findings.¹⁰ However, they included only patients presenting with recurrent vaginal bleeding which may explain this high proportion of imaging. Causes of vaginal bleeding that may be identified on ultrasound include functional ovarian cysts, ovarian masses, foreign body and soft tissue masses of the uterus or genital tract. Moreover, it gives information on uterine size, endometrial thickness and follicular activity, which may be useful in the assessment of pubertal development. It is possible for young girls to experience vaginal bleeding from an isolated

functional ovarian cyst, which is thought to be related to a transient flare in the hypothalamic–pituitary–ovarian activity.^{15,16} Most of them will resolve spontaneously and conservative treatment with clinical and imaging follow-up is usually recommended.¹⁶

A vaginal foreign body is not always identified and cannot be excluded on ultrasound. Toilet paper was identified in both our patients with a foreign body and was also the most common foreign body reported in the series of Zhang *et al.*¹¹ Saline irrigation of the vagina in order to flush it out of the vagina without general anaesthetic has been described for suspected toilet paper foreign body.¹⁷ An alternative approach would be a trial of vulvovaginitis treatment with vinegar baths and encourage splashing of water to the genital area to ‘flush’ the vagina. However, in the absence of clinical improvement or if a foreign body other than toilet paper is suspected, a vaginoscopy should be considered.

Malignant causes of vaginal bleeding in children include rhabdomyosarcoma, yolk sac tumour of the genital tract, and ovarian granulosa cell tumours. During the timeframe of our series, one patient was diagnosed with a vaginal rhabdomyosarcoma, and presented with a protruding vaginal mass, fresh vaginal bleeding and systemic symptoms including poor feeding and growth. Although classical presentation of rhabdomyosarcoma of the genital tract includes vaginal bleeding and grapelike lesions, a recent retrospective study showed that the presentation is more heterogeneous, especially in patients older than 30 months of age, who may present with abdominal mass and non-specific symptoms such as inguinal lymphadenopathy, urinary symptoms, malaise, weight loss or constipation.¹⁸

The cause of bleeding remained unexplained in four (12.5%) cases, which is slightly lower than reported in other series.^{3,9} As our centre is the major referral centre for paediatric gynaecology in the area, a missed or delayed diagnosis of a malignancy would have been identified in this study. Isolated premature menarche has been described as a benign and self-limited cause of vaginal bleeding in prepubertal girls.¹⁹ Its aetiology is poorly understood but an increased endometrial sensitivity to circulating oestrogen or a transient activation of the hypothalamic–pituitary–gonadal axis have been suggested.¹⁹ It remains a diagnosis of exclusion. Benign müllerian papillomas are rare benign tumours of the genital tract that typically present as vaginal bleeding in prepubertal girls but may also be incidental.²⁰ Their diagnosis is based on vaginoscopy and requires histopathology confirmation because their appearance may be difficult to distinguish from rhabdomyosarcoma. The incidence rate of these benign lesions is unknown, and they may account for some of the ‘unexplained’ cases of prepubertal vaginal bleeding where no vaginoscopy was performed.

Our study includes several limitations. Firstly, given its retrospective design, the description of vaginal bleeding and potential associated symptoms may have been incompletely documented in the medical chart. Secondly, the sample size was relatively small, and some patients were lost to follow-up, limiting the applicability of our findings. However, it should be noted that vaginal bleeding is an uncommon presentation in prepubertal children and the study period was only 12 months. Thirdly, the type and severity of presentation of patients that are seen in our service may be biased by the fact that it is part of a tertiary paediatric hospital. Patients with simpler presentation or self-resolved

causes of vaginal bleeding such as withdrawal bleeding in newborns may have been managed by their general practitioner or paediatrician without referral to a paediatric gynaecologist. Fourthly, there were inconsistencies in investigations ordered, due to variation in individual clinician-lead care. The management of vaginal bleeding in prepubertal children is usually left to the discretion of the clinician and has been reported to vary within and between institutions.^{9–11} Going forward, larger prospective longitudinal studies would be useful to confirm the relevance and reliability of the red flags identified in this series to help target investigations and follow-up. The development of evidence-based clinical guidance for management would help to provide optimal and homogeneous care and to improve the outcomes for children presenting with vaginal bleeding.

Conclusions

Our case series emphasises the importance of history-taking and clinical examination in the management of prepubertal vaginal bleeding. Several red flags were identified at presentation and those should lead to further investigations in order to appropriately identify and treat patients with a serious condition or those requiring a specific treatment. In the presence of features consistent with vulvovaginitis and absence of red flags, it is reasonable to manage conservatively without additional investigations. All patients should have clinical follow-up.

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