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Erythema Gyratum Repens and Malignancy: A Diagnostic Red Flag or Clinical Misinterpretation?

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ABSTRACT

Objectives: Erythema gyratum repens (EGR) is a rare, figurate dermatosis best known for its striking appearance and association with internal malignancy. This review aims to provide an updated synthesis of literature from 2015 to 2025, focusing on the clinical presentation, pathophysiology, and both malignant and non-malignant associations of EGR.

Methods: A narrative literature review was conducted using PubMed, MEDLINE, and Embase. Case reports, series, and review articles were included based on relevance to EGR's etiology, clinical features, diagnostic strategies, and outcomes.

Results: EGR remains strongly associated with internal malignancies, particularly lung and esophageal cancers, with 70–82% of cases occurring in a paraneoplastic context. In many instances, the rash precedes cancer diagnosis, reinforcing its role as a cutaneous warning sign. Increasingly, cases have been reported in benign settings—such as infections, autoimmune diseases, and drug reactions—supporting an immune-mediated mechanism. Clinically, EGR is marked by concentric, erythematous, wood-grain-like rings and rapid peripheral spread. Case reports from the past decade illustrate a wide spectrum of presentations and underscore the importance of context in evaluating EGR.

Conclusions: EGR remains a valuable dermatologic indicator of systemic disease. While it frequently signals malignancy, its presence also warrants evaluation for non-malignant causes. Early recognition and a broad diagnostic approach are essential to guide appropriate investigation and management.

Keywords: Erythema Gyratum Repens; Paraneoplastic Syndromes; Malignancy; Cutaneous Manifestations; Dermatologic Signs

Introduction

Erythema gyratum repens is a rare cutaneous syndrome characterized by striking concentric, gyrate erythematous bands that create a wood-grain pattern on the skin [1]. First described by Gammel in 1952, EGR is most notorious as a paraneoplastic dermatosis strongly associated with internal malignancies [2,3]. Of note, the majority of reported EGR cases (approximately 70–82%) occur in the context of an underlying cancer, typically lung carcinoma, making EGR a potential diagnostic "red flag" for clinicians [1]. However, EGR is not an absolute marker of malignancy; a significant proportion of cases arise from non-malignant causes such as infections, autoimmune disease, or drug reactions [1]. This overlap complicates interpretation, as the presence of EGR—manifesting as rapidly migrating, erythematous rings with trailing scale that resemble wood grain patterns—strongly raises clinical suspicion for malignancy but does not confirm its presence (Figure 1) [4]. This review provides clinicians and researchers a comprehensive overview of EGR, drawing on literature published from 2015 to 2025. We describe the clinical presentation of EGR, discuss the current understanding of its pathophysiology, and examine both malignant and non-malignant associations with equal emphasis.

The role of EGR as a diagnostic indicator is highlighted, including its utility in prompting earlier detection of occult malignancies and the importance of a thorough differential diagnosis. Tables are included to compare malignant versus benign case features, summarize key study findings, and outline diagnostic pathways from initial presentation to final diagnosis and management.

Figure 1: Classic "wood-grain" lesions of erythema gyratum repens on a patient's back. Multiple concentric erythematous rings with serpiginous borders are present, with a fine trailing scale at the inner edge of the advancing plaques. This distinctive figurate pattern is highly characteristic of EGR and aids in its clinical recognition [5].

Methods

We performed a narrative literature review focusing on EGR publications from January 2015 through early 2025. The search used three key databases – PubMed, Web of Science, and Google Scholar – to ensure broad coverage of both indexed and gray literature. We used combinations of keywords related to EGR and its associations, including "erythema gyratum repens" paired with terms such as "malignancy," "paraneoplastic," "cutaneous manifestations," and "dermatologic signs," among others. No language restrictions were applied; both English and non-English articles were considered, and non-English reports were included if sufficient data could be extracted (with translation of key information when necessary). The search strategy was iterative, with reference lists of relevant papers hand-searched to identify any additional reports not captured in the initial query. Inclusion criteria encompassed any peer-reviewed publication providing clinical or research data on EGR between 2015 and 2025. This ranged from single-patient case reports and small case series to broader narrative reviews and pertinent observational studies discussing EGR (for example, analyses of paraneoplastic skin manifestations that included EGR). We included reports of EGR in both malignant (paraneoplastic) and non-malignant contexts to capture the full spectrum of this condition. Articles were excluded only if EGR was briefly mentioned without substantive detail or if they fell outside the 2015–2025 timeframe. Given the rarity of EGR, most included sources are descriptive in nature. Data from each eligible publication were synthesized narratively, focusing on patient demographics, underlying associated conditions (malignancy or alternative causes), geographic origin of cases, and any investigational insights into pathophysiology or outcomes. Because this was a narrative review, no formal quality assessment or meta-analysis was performed; instead, the goal was to qualitatively assemble current knowledge and highlight emerging patterns in the recent literature.

Results

Literature Yield

The search identified a limited, but informative body of literature on EGR from 2015 to 2025, amounting to approximately two dozen publications. The majority of these were single case reports documenting individual patients, with a few small case series (reporting 2–3 patients each), several review articles and expert commentaries that discussed EGR in the context of paraneoplastic dermatology [5,6]. In total, about 15–20 distinct case reports were included, supplemented by a handful of broader analyses. This distribution reflects the rarity of EGR and the consequent reliance on individual clinical

reports in the recent literature. The case reports spanned a wide geographic range, underscoring that recognition of EGR is global. Publications over the last decade have originated from North America, Europe, Asia, and elsewhere. For example, recent case reports were described in France [7], the United States [8], Egypt [9], Germany [10], Brazil [11], India [12], and Japan [13], among other countries. There was no evident clustering of reports by region or year; instead, sporadic cases were documented internationally throughout the decade, consistent with EGR's sporadic and rare occurrence worldwide.

Types of Associations

A critical finding from this past decade of literature is that paraneoplastic EGR continues to predominate. The majority of reported EGR cases – roughly 70% overall – were associated with an underlying malignancy [11]. Among the malignancy-associated cases, internal carcinomas were the most common triggers, in line with historical patterns. Notably, lung carcinoma (including bronchogenic and tracheal tumors) remains a leading associated cancer in EGR patients [10], and esophageal carcinoma is another frequently cited trigger [14]. Several case reports from 2015 to 2025 detailed EGR arising in patients with these classic malignancies; for instance, EGR was reported in individuals with advanced lung/tracheal adenocarcinoma and with esophageal squamous cell carcinoma [10-14]. In addition, the literature expanded to include a broader array of tumor types as precipitating factors. Multiple reports identified hematologic malignancies, such as leukemias and lymphomas, as causes of EGR [12-15]. There were also uncommon associations, including cases of anal squamous cell carcinoma and other less typical neoplasms presenting with paraneoplastic EGR [16]. Across many of these reports, a consistent theme was that the skin eruption often preceded or coincided with the diagnosis of the internal malignancy, reinforcing EGR's role as an early warning sign for occult cancer. In several cases, recognition of the characteristic EGR rash prompted comprehensive cancer screening that led to the detection of an otherwise asymptomatic tumor, sometimes months earlier than detection without the dermatologic clue [17].

Authors frequently noted that successful treatment of the underlying cancer often resulted in gradual resolution of the EGR rash, further supporting the pathogenic link between the neoplasm and the dermatosis [12]. Importantly, not all EGR cases in the recent literature were associated with cancer. Approximately 20–30% of the reported cases from 2015 to 2025 occurred in a non-malignant context, a significant minority that is consistent with prior estimates [11]. These non-paraneoplastic instances of EGR (sometimes termed "EGR-like" eruptions) were linked to diverse benign underlying triggers. Several reports described EGR manifestations arising alongside chronic inflammatory skin disorders. For example, patients with long-standing pityriasis rubra pilaris (PRP) experienced a transformation of their eruptive plaques into an EGR-like pattern – in some cases attributed to the use of systemic retinoids (acitretin) during PRP therapy [7-18]. Likewise, an EGR-like presentation of psoriasis was documented in one case, where a resolving psoriatic plaque evolved into the gyrate "wood-grain" rings characteristic of EGR [9]. In all of these patients, extensive malignancy workups were negative; the EGR-like rash was instead attributed to the underlying dermatologic condition and its treatment. Infectious etiologies were another important category. For instance, a notable report from 2023 detailed EGR secondary to pulmonary tuberculosis (TB), in which the patient's expanding annular rash was ultimately traced to TB infection rather than to cancer [8].

Fungal infection has also been associated with an EGR-like eruption. In 2019, a patient with cutaneous T-cell lymphoma (Sézary syndrome) developed an EGR-like rash that was linked to an accompanying dermatophyte (fungal) infection [19]. Additionally, drug-induced EGR has been identified: apart from the aforementioned acitretin-associated cases in PRP, other medications that alter immune status have been suspected of triggering EGR in isolated instances. Collectively, these non-malignant cases underscore that EGR is not exclusively a harbinger of cancer. Severe immune dysregulation from varied causes – whether an autoimmune/inflammatory disorder, an infection, or a pharmacologic agent – can sometimes produce the same clinical presentation. In such scenarios, treating the root cause has often led to resolution of the EGR-like lesions [8-20], reinforcing the concept of EGR as an exaggerated immune-mediated reaction pattern.

Patterns and Associations in Recent Literature

A number of recurring themes emerged from the reviewed literature. First, the consistent paraneoplastic association of EGR was strongly reaffirmed. Across case reports and series, authors emphasized the need for comprehensive evaluation for internal malignancy when EGR is diagnosed, given the high likelihood of an underlying cancer. In our reviewed literature, approximately 70–82% of patients were found to have an associated malignancy, a statistic that echoes long-standing clinical observations [17]. While lung cancer remains the most frequently reported malignancy, recent publications have expanded awareness that EGR can be triggered by a broader spectrum of neoplasms, including both solid and hematologic tumors [21].

Second, in patients without malignancy, other triggers share a common theme of immune dysregulation. Chronic inflammatory dermatoses such as pityriasis rubra pilaris (PRP) and psoriasis, along with persistent infections like tuberculosis, were prevalent among the benign causes. These findings suggest that a sufficiently dysregulated or intense immune response may phenocopy the EGR pattern. In such instances, the term "EGR-like eruption" was often used to describe these morphologically similar but non-paraneoplastic presentations, and clinicians were cautioned against anchoring solely on malignancy when initial workups were negative [9,18]. Third, a shared observation was that effective treatment of the underlying condition—whether cancer, infection, or immune-mediated disease—typically resulted in resolution of the EGR rash.

Multiple reports described rapid improvement or complete clearance of EGR following tumor resection, immunosuppressive therapy, or infection control. These outcomes support the prevailing hypothesis that EGR is driven by an immune-mediated mechanism, in which the withdrawal of antigenic stimulation—tumor-derived, infectious, or autoimmune—terminates the cutaneous response (Figure 2) [8,15,20]. Lastly, the 2015 to 2025 literature strongly reaffirmed EGR's role as a clinical "red flag." Regardless of whether the etiology was malignant or benign, nearly all cases prompted extensive diagnostic investigations. In several patients, this vigilance facilitated the early diagnosis of occult but treatable conditions, most notably internal malignancies, further emphasizing the diagnostic importance of recognizing EGR in clinical practice [22]. In conclusion, this narrative synthesis of the past decade of literature confirms that while EGR remains rare, it continues to be recognized globally as a distinctive dermatosis with significant diagnostic implications. Its core clinical and histologic characteristics remain consistent with earlier descriptions, and no substantial shifts in pathogenesis have been identified. Rather, the literature highlights a growing awareness that EGR-like eruptions can result from non-neoplastic immune phenomena. This evolving perspective is essential for clinicians, particularly when comprehensive malignancy workups are negative. These findings are expanded upon in the subsequent sections, which delve into the clinical features, pathophysiology, differential diagnosis, and management strategies for EGR.

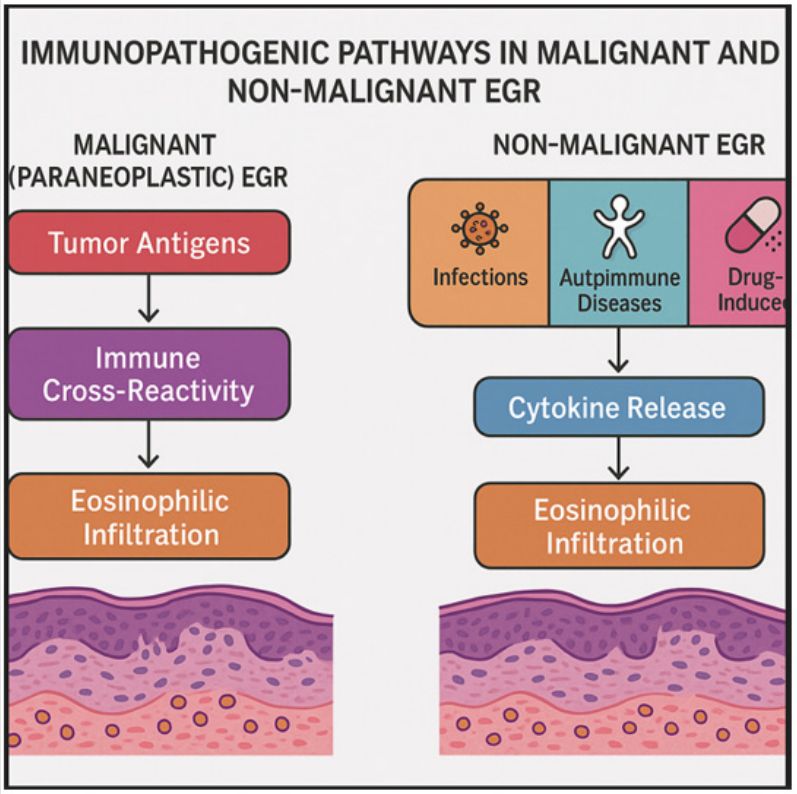

Figure 2: Immunopathogenic Pathways in Malignant and Non-Malignant EGR.

Discussion

Clinical Presentation and Diagnosis of EGR

Clinically, EGR presents as multiple erythematous rings or whorled bands on the skin that spread rapidly and concentrically. The lesions often form arcuate and polycyclic patterns with parallel arrangements, creating their characteristic wood-grain appearance [6]. A fine trailing scale is typically seen at the inward edge of the advancing erythema, and the eruptive bands can migrate at approximately 1 cm per day [23]. The eruption tends to cover a substantial portion of the body, frequently involving the trunk and proximal extremities. However, the palms, soles, and face are usually spared [1]. Patients often report intense pruritus or a burning sensation that accompanies the rash [16]. Systemic symptoms (fever, malaise) are usually absent unless related to an underlying condition. Due to EGR's distinctive morphology, clinical diagnosis is often sufficient [1]. In practice, the

presentation of EGR is so distinctive that it serves as a clinical clue pointing toward a paraneoplastic skin eruption. EGR lesions develop quickly and relentlessly—often within weeks—which helps distinguish EGR from other gyrate erythemas. The differential diagnosis primarily includes erythema annulare centrifugum (EAC), another figurate erythema that can appear as annular, trailing-scale plaques. However, EAC lesions generally expand much more slowly (over weeks to months) and tend to remain localized, whereas EGR spreads rapidly over large body areas [1].

Other annular rashes (such as tinea corporis, or subacute cutaneous lupus erythematosus) usually lack the dramatic concentric wood-grain configuration and rapid migratory behavior of EGR [24]. Histopathology of EGR is nonspecific, but it can support its diagnosis by excluding mimickers. Skin biopsy typically shows psoriasiform or spongiotic epidermal changes with mild hyperkeratosis, acanthosis, and focal parakeratosis (Figure 3) [1,25]. A perivascular lymphocytic infiltrate in the dermis is common, often accompanied by a marked increase of eosinophils [1-16]. Although these features are not pathognomonic, the presence of eosinophil-rich inflammation aligns with the presentation of EGR (and paraneoplastic eruptions in general) [16]. Direct immunofluorescence is usually negative, helping to rule out autoimmune bullous disorders with annular configurations. Ultimately, the diagnosis of EGR relies on recognizing the characteristic clinical morphology and correlating it with histology, while also being alert to any associated systemic disease. Once EGR is identified, clinicians must proceed with a two-pronged diagnostic approach:

(1) Evaluate for an occult malignancy, and

(2) Consider alternative non-malignant causes if initial malignancy workup is negative.

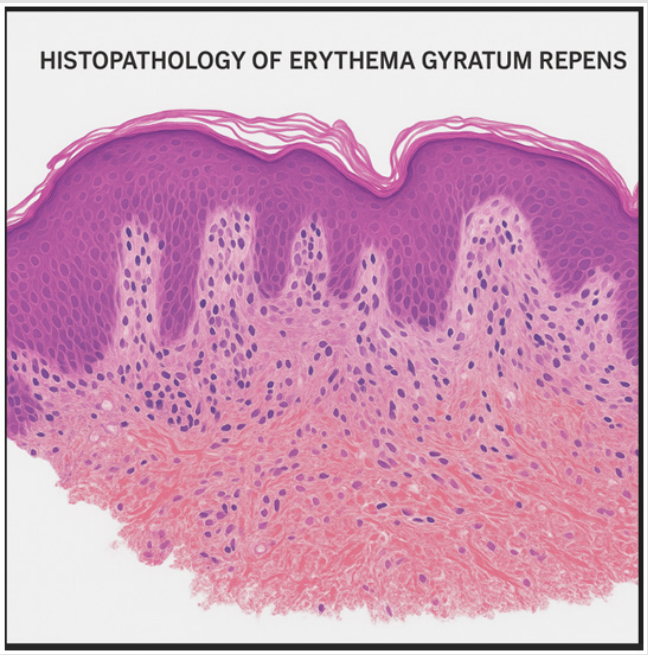

Figure 3: Histopathology of Erythema Gyratum Repens

Table 1 compares key features of paraneoplastic versus non-paraneoplastic EGR cases, highlighting the similarities and differences in skin findings in a typical presentation. The above non-malignant associations illustrate that EGR is a cutaneous reaction pattern with diverse potential triggers. In each category, the underlying theme is an aberrant immunologic state – whether due to chronic infection, severe skin inflammation, a drug perturbing the immune system, or an autoimmune process – that can generate the same clinical morphology as paraneoplastic EGR. For instance, pityriasis rubra pilaris (PRP), an inflammatory dermatosis, has an unusual propensity to transition into an EGR-like eruption, especially under retinoid therapy [18-26]. In fact, malignancy was negative in multiple patients who reported the appearance of EGR-like eruptions towards the resolution phase of PRP [18,20,26]. This reinforces the notion that not all EGR indicates cancer. Likewise, an EGR-like presentation of psoriasis was documented in one case, where a resolving psoriatic plaque evolved into the gyrate "wood-grain" rings characteristic of EGR [9]. In these patients, extensive malignancy workups were negative; the EGR-like rash was instead attributed to the underlying dermatologic condition and its treatment. Additionally, an EGR-like eruption was reported in

a patient with epidermolysis bullosa acquisita (associated with ulcerative colitis), further highlighting that an autoimmune disorder alone can trigger the EGR pattern [27]. Infectious etiologies were another important category: a notable report from 2023 detailed EGR secondary to pulmonary tuberculosis, in which the patient's expanding annular rash was ultimately attributed to a TB infection rather than to a cancer [8].

Table 1: Comparison of Malignant-Associated vs. Non-Malignant EGR.

Aspect	Paraneoplastic EGR (Malignant)	Non-Paraneoplastic EGR (Benign)
Frequency	~70–82% of EGR cases involve an internal malignancy [1-26].	~18–30% of EGR cases have no associated malignancy [1].
Typical Patient	Middle-aged to elderly (~60 years); more common in males (~2:1); often with cancer risk factors like smoking [1].	Can occur at any age; no strong sex predilection (varies by case series).
Common Triggers	Internal cancers—most commonly lung (32–47%), then esophageal (8–11%), breast (6–8%), others less frequent [26-27].	Infections (e.g., TB) [8]; inflammatory dermatoses [9-18]; autoimmune diseases [28]; drugs [7].
Clinical Presentation	Same in both: concentric, scaly, itchy, red rings. Often widespread in malignant cases.	Clinically identical rash; distribution may vary according to underlying cause [18].
Associated Symptoms	Cancer-related signs: weight loss, fatigue, cough, anemia. Rash may precede tumor symptoms [15-17].	Symptoms depend on cause (e.g., TB: cough/fever; autoimmune: joint pain). Patient may otherwise be well.
Diagnostic Approach	Prompt full cancer workup: imaging, tumor markers, endoscopy as needed. Biopsy supportive but nonspecific [17].	Malignancy screening is recommended. If benign cause identified and no cancer is found, monitor and consider treatment [11]. Continued surveillance recommended.

There is also evidence implicating fungal infection in at least one EGR-like eruption in an immunocompromised host. In a 2019 case, a patient with cutaneous T-cell lymphoma (Sézary syndrome) developed an EGR-like rash that was linked to an accompanying dermatophyte (fungal) infection [19]. Additionally, drug-induced EGR has been recognized: apart from the aforementioned acitretin-associated cases in PRP, other medications that alter immune status have been suspected of triggering EGR in isolated instances. Collectively, these non-malignant cases underscore that EGR is not exclusively a harbinger of cancer; severe immune dysregulation from varied causes – whether an autoimmune or inflammatory disorder, an infection, or a pharmacologic agent – can sometimes produce the same clinical picture. For instance, an eosinophilic dermatosis of unknown cause has been reported to masquerade as an EGR-like eruption without any underlying malignancy [28,29]. In such scenarios, treating the root cause has often led to resolution of the EGR-like lesions [8,20], reinforcing the concept of EGR as an exaggerated immune-mediated reaction pattern.

Pathophysiology and Mechanisms

The pathogenesis of erythema gyratum repens remains poorly elucidated, though it is widely regarded as a paraneoplastic dermatosis in the majority of reported cases. As a paraneoplastic phenomenon, it is hypothesized that tumor-derived factors trigger an aberrant immune-mediated response within the skin. One prevailing theory posits that neoplastic cells express antigens—or provoke the generation of antibodies—that cross-react with cutaneous components, thereby eliciting the characteristic concentric, gyrate erythema seen in EGR [1]. This mechanism is thought to reflect a form of molecular mimicry or immune dysregulation, where the skin becomes an unintended target in the context of a systemic immune response. Supporting this hypothesis is the well-documented observation that resolution of the eruption often parallels successful treatment of the underlying malignancy, implying a direct causal relationship between the tumor and the cutaneous manifestations [16]. Furthermore, immunologic markers such as eosinophilia have been noted in both tissue biopsies and peripheral blood during active EGR episodes, pointing toward the involvement of hypersensitivity or cytokine-driven pathways in its pathophysiology [1, 30]. Several authors have suggested that neoplasms may secrete interleukin-5 or other cytokines that specifically stimulate eosinophil proliferation and activation, which could then contribute to the development of the distinctive rash [1,16].

Another postulated mechanism involves the deposition of immune complexes within the dermal vasculature, a process seen in other immune-complex-mediated dermatoses; however, direct evidence for this pathway in EGR is currently limited and remains speculative. In non-neoplastic contexts, similar immune pathways are believed to contribute to disease expression. The notion of EGR as a "facultative" paraneoplastic dermatosis has emerged, acknowledging that while a strong association with malignancy exists, it is not pathognomonic. Cases of EGR without any detectable neoplasm suggest that profound immune activation—whether from autoimmune disorders, chronic inflammatory states, or drug reactions—may independently trigger the rash. These processes may involve autoantibody production, T-cell activation, or dysregulated cytokine release, all capable of inducing the figurate, serpiginous erythema characteristic of EGR [1]. Notably, instances where idiopathic or persistent EGR has responded

to immunomodulatory therapies, such as systemic corticosteroids or oral retinoids, reinforce the likelihood of an immune-mediated pathogenesis [11]. The therapeutic efficacy of immunosuppression further strengthens the argument that even in non-malignant cases, immune dysregulation plays a central role. It is essential to underscore that while the correlation between EGR and internal malignancy is high, it is not absolute. Historical literature often treated EGR as an obligate marker of occult cancer, prompting extensive neoplastic workups in affected individuals [5]. However, more recent analyses—including a systematic review by Rongioletti, et al. [1] and accumulating case reports—have documented occurrences of EGR in individuals without any detectable malignancy [4,18]. These findings have prompted a conceptual shift, wherein EGR is now more accurately described as a facultative paraneoplastic dermatosis: highly suggestive of malignancy, but not exclusively so. Clinicians should maintain a high index of suspicion for cancer in patients with EGR while also considering alternative immune-mediated triggers in the differential diagnosis [1,28].

Malignant Associations of EGR

The dermatologic and oncologic literature has documented EGR's strong link to internal malignancies. Large case compilations indicate that roughly four out of five patients with EGR have an underlying neoplasm, often at the time of skin eruption or shortly thereafter [31]. The typical cancers associated with EGR are bronchogenic carcinoma of the lung, esophageal carcinoma, and breast carcinoma, but many others have been reported [11]. Table 2 summarizes representative cases from 2015 to 2025, illustrating the range of malignancies linked to EGR and their outcomes. In addition to the above, numerous other malignancies have been linked to EGR in literature, including gastric adenocarcinoma [6], colon cancer [5], pancreatic cancer [17], bladder and prostate cancer (Li, Lian-Jie et al. [32,33]), as well as certain hematologic neoplasms such as T-cell prolymphocytic leukemia and cutaneous T-cell lymphoma (Sézary syndrome) [19]. Several important patterns emerge from the malignant cases. First, lung carcinoma stands out as the single most common associated cancer, accounting for roughly one-third to one-half of paraneoplastic EGR cases [26-30]. Both major subtypes of lung cancer (squamous cell carcinoma and adenocarcinoma) have been reported in EGR patients. The predominance of lung cancer may reflect the high prevalence of lung malignancies in the typical EGR demographic (older smokers), as well as a possibly higher tendency for lung tumors to incite cutaneous immune reactions.

Table 2: Selected Case Reports of Paraneoplastic EGR (2015–2025).

Reference (Year)	Malignancy	Key Findings
Malek, et al. [16]	Acute myeloblastic leukemia (AML)	Concurrent EGR and AML diagnosis. Rash resolved with induction chemotherapy.
Sauvageau, et al. [18]	Lung adenocarcinoma	EGR was the first sign in a 71-year-old smoker, led to the discovery of asymptomatic lung mass. Rash resolved after tumor resection.
Rao, et al. [13]	Diffuse large B-cell lymphoma (DLBCL)	Rare hematologic case. EGR prompted cancer workup. Rash improved with chemotherapy.
Prouty & Liu, et al. [36]	Anal cancer	Classic EGR rash on thighs; similar course to Saeed et al. Rash improved post-treatment.
Votquenne & Richert, et al. [33]	Prostate carcinoma	Classic EGR rash and lymphocytic infiltrate on histology. Elevated prostate-specific antigens and lymphadenopathy. Rash led to discovery of prostate cancer.
Matta, et al. [14]	Esophageal squamous cell carcinoma	Classic EGR rash with dysphagia led to diagnosis. Rash subsided after chemoradiation.
Saeed, et al. [16]	Anal squamous cell carcinoma	Rash misdiagnosed as eczema for 11 months . Cancer found during weight loss workup. Rash resolved with chemoradiation.
Oberndörfer, et al. [10]	Tracheal adenocarcinoma (metastatic)	Rare tumor site. EGR noted as a cutaneous paraneoplastic sign. Rash resolved after cancer treatment.
Shah, et al. [5]	Various solid tumors	Case series review. Reaffirmed lung and esophageal cancers as common causes. Urged malignancy screening in annular rashes.

Second, EGR often precedes the diagnosis of malignancy, sometimes by a significant interval. On average, published cases suggest EGR appears about 4–9 months before the internal malignancy is discovered [26-34]. For example, Sauvageau et al. [18] noted that the rash led to an asymptomatic 8 cm lung tumor finding, presumably earlier than it might have been detected otherwise [18]. This kind of lead-time has critical diagnostic value: recognizing EGR can prompt clinicians to perform cancer screenings that result in earlier intervention and improved patient outcomes. Indeed, there are instances where astute physicians, aware of EGR's implications, have identified occult malignancies in time for curative therapy [12-17]. Third, while solid tumors predominate, hematologic malignancies are equally important. Since 2015, multiple reports have noted EGR in patients with leukemia and lymphoma [12-15]. This includes both cutaneous T-cell

lymphomas (where EGR-like eruptions may arise in the setting of immune dysregulation or concomitant infections) and systemic lymphomas and leukemias. Clinicians should therefore not overlook basic hematologic evaluation (e.g., complete blood counts, peripheral smear) when searching for an underlying cause of EGR, especially if no solid tumor is found. Finally, it bears emphasis that successful treatment of an underlying malignancy usually leads to resolution of EGR. In nearly all reported paraneoplastic cases, the gyrate rash faded and disappeared once the cancer was removed or brought into remission. Conversely, persistence or recurrence of EGR may indicate an untreated or recurrent tumor, underscoring its value in ongoing monitoring.

Non-Malignant Associations of EGR

While most cases of EGR are paraneoplastic, a notable subset of cases arise from non-malignant causes. In these instances, the eruption is sometimes termed "EGR-like" if slight deviations from classic EGR are present, but often the clinical picture is indistinguishable from paraneoplastic EGR [18]. Recognizing these alternative etiologies is crucial to avoid misdiagnosis and to ensure patients receive appropriate treatment for the true underlying condition. Key categories of non-malignant associations include chronic inflammatory dermatoses, infections, drug reactions, and autoimmune disorders, as summarized in Table 3 [35-49]. The above non-malignant associations illustrate that EGR is a cutaneous reaction pattern with a wide range of potential triggers. In each category, the underlying theme is an aberrant immunologic state – whether due to chronic infection, severe skin inflammation, a drug perturbing the immune system, or an autoimmune process – that can generate the same clinical morphology as paraneoplastic EGR. For instance, pityriasis rubra pilaris, an inflammatory dermatosis, has an unusual propensity to transition into an EGR-like eruption, especially under retinoid therapy [18-26]. Multiple PRP patients have been reported [18,20,26] in which no malignancy was found. In those reports, EGR-like eruptions appeared during the resolution phase of PRP, reinforcing that not all EGR implies cancer. Overall, recognizing these non-malignant scenarios is important so that clinicians maintain a balanced approach: aggressively search for malignancy, but also treat and investigate other possible causes of EGR when appropriate.

Table 3: Non-Malignant Conditions Associated with EGR.

Category	Examples	Key Points
Chronic Dermatoses	PRP, Psoriasis [8,10,19,22,25,28,37,38]	EGR-like changes noted during healing of inflammatory dermatoses, often on systemic retinoids. No malignancy found.
Infections	TB [8], Dermatophytosis [19]	TB and fungal infections can trigger EGR via immune activation. Rash resolves with antimicrobial therapy.
Drug Reactions	Acitretin [7], IL-17 inhibitors [29], Methotrexate [37]	EGR induced by medications used for dermatoses. Rash improves after stopping the drug.
Autoimmune Disease	CREST, HES, Epidermolysis Bullosa Acquisita [4,31]	Autoimmune processes can mimic paraneoplastic EGR; immune dysregulation is a likely driver. Treating the primary condition often improves rash.
Idiopathic	No identified cause {Oberndörfer, F et al. [10]}	Diagnosis of exclusion after full workup. Periodic re-evaluation is essential; some cases later reveal malignancy or autoimmunity.

Conclusion

Erythema gyratum repens is a significant sign of systemic pathology in dermatology. While alarming in appearance, its distinctive wood-grain rings are ultimately a benign skin process – yet one that often heralds a malignancy or other serious condition beneath the surface. Over the past decade (2015–2025), the literature has reinforced EGR's status as one of the most specific cutaneous indicators of paraneoplastic syndromes, particularly for lung and esophageal cancers [5], while also broadening our awareness of non-malignant scenarios in which it can arise [11-18]. For clinicians, recognizing EGR is critical. It should prompt an immediate and exhaustive workup for internal malignancy, potentially leading to life-saving early cancer detection [17]. At the same time, a measured approach is needed to evaluate for infections, drug exposures, or autoimmune causes in the fraction of patients who will not have a cancer diagnosis [8,9]. From a pathophysiological standpoint, EGR reminds us of the intricate cross-talk between the skin and the rest of the body. The exact mechanism linking tumors (or other triggers) to the gyrate rash remains to be fully elucidated, but immunologic phenomena are most likely central [16]. Future research may uncover specific antigens or pathways that drive EGR, which could further solidify its role as a diagnostic marker and even present targets for therapy to hasten rash resolution. In the meantime, EGR management will continue to focus on treating the underlying cause.

The reward for doing so is evident: as this review has shown, in case after case, the disappearance of EGR has correlated with successful treatment of the patient's internal disease [16-17]. In conclusion, though rare, erythema gyratum repens is important as a dermatologic sign. Its presence should never be ignored or merely treated with symptomatic therapies; instead, it should galvanize a search for hidden disease. By maintaining a high index of suspicion and a broad investigational strategy, clinicians can leverage the appearance of EGR

to diagnose underlying malignancies at an earlier stage or to identify other treatable conditions. Thus, EGR exemplifies the concept of the skin as a "mirror of internal malignancy" – and equally a mirror of other internal disorders – reminding us that careful observation of the skin can yield critical insights into overall patient health [6]. With a balanced and thorough approach, we can ensure that this striking rash serves its purpose as a diagnostic beacon, guiding patients to timely and appropriate care.

Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

Conceptualization, C.P.; methodology, C.P.; software, C.P.; validation, C.P., A.H., and A.G.; formal analysis, C.P. and A.H.; investigation, C.P. and A.H.; resources, C.P.; data curation, C.P.; writing—original draft preparation, C.P. and A.H.; writing—review and editing, A.G. and C.P.; visualization, C.P.; supervision, A.G.; project administration, C.P. All authors have read and agreed to the published version of the manuscript.

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