Erysipelothrix rhusiopathiae

Microbiology, Clinical Features, Diagnosis & Treatment

Bacteria
Zoonotic Gram-Positive Rods
May 2026

Vancomycin Resistance Sets This Organism Apart from Other Gram-Positive Bacteria

Erysipelothrix rhusiopathiae is a globally distributed zoonotic pathogen most commonly associated with occupational exposure to fish, swine, and poultry.

It is a slender, pleomorphic, non-sporulating, Gram-positive rod that belongs to the family Erysipelotrichaceae.

- Zoonosis — classically linked to **fish and swine** exposure in examinations
- Gram-positive, non-sporulating, non-motile, catalase-negative rod
- Principal reservoir: **domestic swine** (tonsils, lymphoid tissue, faeces)
- Intrinsically **resistant to vancomycin** — the most clinically important feature
- Treatment of choice: **penicillin, cephalosporins, clindamycin**
- Diagnosis: lesion biopsy (full-thickness); blood culture if systemic disease suspected

Erysipelothrix Occupies Its Own Bacterial Family, Distinct from Corynebacteria

Previously grouped near corynebacteria, Erysipelothrix spp. are now classified in their own family, **Erysipelotrichaceae**.

The genus includes two clinically relevant species:

- **E. rhusiopathiae** (best characterised pathogen)
- **E. tonsillarum**

Morphology & Growth

- Small, slender, Gram-positive rods; may form filaments in older cultures
- Facultatively anaerobic
- Alpha-haemolytic on blood agar; small colonies appear after 24–48 hours

Biochemical Profile

- Catalase-negative
- H2S-positive (blackening on triple sugar iron agar)
- Non-motile
- Esculin hydrolysis: negative

> *The H2S production on triple sugar iron agar producing blackening of the butt is a particularly*

Occupational Animal Exposure Drives the Majority of Human Infections

Transmission Pathways

Human infection primarily results from direct cutaneous contact with infected animals or animal products, particularly through minor skin trauma.

The organism can also colonise the human oropharynx and gastrointestinal tract, enabling infection without direct occupational exposure.

High-Risk Occupations

- **Fishermen and fish handlers** (most commonly cited in examinations)
- Butchers, abattoir workers, and slaughterhouse workers
- Farmers (especially pig and poultry)
- Veterinarians and meat-processing workers
- Housewives handling raw meat or fish

Host Factors & Comorbidities

Underlying comorbidities are over-represented among patients who develop severe systemic infection.

- Cardiovascular disease
- Diabetes mellitus
- Alcoholism
- Chronic liver disease

Intracellular Survival and Capsule Production Enable Immune Evasion

Virulence factors of *E. rhusiopathiae* are not fully characterised, but two key mechanisms have been identified that allow the pathogen to evade the host immune system.

1

Capsule Production

The presence of a capsule protects the organism from **phagocytosis** and other host innate immune defences.

This structural feature is critical for the initial establishment of infection following inoculation.

2

Macrophage Survival

The ability to survive within macrophages allows for **persistence and dissemination** despite innate immune responses.

These properties contribute to the organism's capacity to cause both localised and invasive disease, and may explain the strong association with

Erysipelothrix Causes Three Clinically Distinct Disease Syndromes

Erysipeloid (Localised)

SEVERITY: MILD

- Violaceous, non-suppurative plaque on hands/fingers
- Raised borders
- Burning or throbbing pain
- Self-limiting

Diffuse Cutaneous Disease

SEVERITY: MODERATE

- Multiple plaques extending beyond inoculation site
- Presence of bullae
- Associated with fever, malaise, and myalgia

Systemic Infection & Endocarditis

SEVERITY: SEVERE

- Bacteremia
- Infective endocarditis (predominantly native valves)
- High mortality rate (40%)

> The localised erysipeloid form (**Erysipeloid of Rosenbach**) is the classic and most common presentation, appearing 1–7 days after exposure and resolving in 2–4 weeks.

Erysipeloid of Rosenbach Is the Hallmark Presentation Seen in Examinations

Erysipeloid of Rosenbach is a well-demarcated, violaceous (purple-red), non-suppurative plaque with raised borders.

It typically appears on the fingers, hands, or other exposed skin at the site of minor trauma following contact with animals or fish.

Clinical Features

- Onset 1–7 days after exposure
- Burning or throbbing pain; occasional vesicles
- Usually no significant systemic symptoms
- Lymphadenopathy, fever, and arthralgia may occur in some cases
- Self-limiting: resolves within 2–4 weeks

Differential Diagnosis

It is crucial to differentiate Erysipeloid from Staphylococcal or Streptococcal cellulitis.

Distinguishing Features:

- Violaceous colour (not erythematous)
- Absence of suppuration (pus)
- Severe burning/throbbing pain

Bacteremia Carries 40% Mortality and Is Strongly Associated with Endocarditis

Systemic **E. rhusiopathiae** infection is rare but life-threatening.

It presents with bacteremia, often accompanied by severe sepsis, and carries a high rate of infective endocarditis.

Underlying comorbidities (cardiovascular disease, diabetes, alcoholism, chronic liver disease) are over-represented among patients who develop systemic infection.

90%

ASSOCIATED WITH ENDOCARDITIS

Of all bacteraemia cases

80%

HEART FAILURE RATE

In cases of endocarditis

40%

MORTALITY RATE

For systemic infections

Key Clinical Features:

- Predilection for the **aortic valve**
- Predominantly affects **native valves**
- Erysipeloid-like skin lesions may be present alongside systemic features
- Strongly associated with animal or fish exposure

Full-Thickness Lesion Biopsy Is Essential as Bacteria Reside in the Deep Dermis

Sample Collection

- **Lesion biopsy:** bacteria are present in the deeper part of the lesion; a full-thickness biopsy is required for adequate yield.
- **Blood culture:** indicated if the patient is unwell or immunocompromised.
- If blood culture is positive, echocardiography (ECHO) should be performed to investigate for endocarditis.

Culture & Growth

- Grows on standard aerobic media (e.g., blood agar).
- Colonies are small and slow to appear — risk of misidentification as normal flora or contaminants.
- **H_2S production** on triple sugar iron agar leads to blackening of the butt (a very useful diagnostic clue).

Laboratory Identification

- **MALDI-TOF MS:** provides rapid and reliable species-level identification in most routine laboratories.
- **Molecular methods:** 16S rRNA gene sequencing or PCR assays targeting *E. rhusiopathiae* genes can confirm identification.

Catalase-Negative, Non-Motile, Alpha-Haemolytic Profile Distinguishes Erysipelothrix

Characteristic	Erysipelothrix	Listeria	Arcanobacterium
Haemolysis	**Alpha**	Beta (tight zone)	Beta
Catalase	**Negative**	Positive	Negative
Motility	**Negative**	Positive	Negative
H2S production	**Positive**	Negative	Negative

Additional Features

- **Oxygen requirement:** Facultatively anaerobic
- **Esculin hydrolysis:** Negative
- **Identification:** MALDI-TOF MS, PCR targeting specific genes

> *The combination of alpha-haemolysis, catalase negativity, non-motility, and H2S production on TSI agar is highly characteristic of* ***Erysipelothrix****.*

Erysipelothrix Is Intrinsically Resistant to Vancomycin — a Critical Empiric Therapy Consideration

Susceptible

Most Active Agents:

- Penicillin
- Imipenem

Also Susceptible:

- Piperacillin
- Cefotaxime
- Ciprofloxacin & Pefloxacin
- Clindamycin

Resistant

Intrinsically Resistant:

- **Vancomycin**
- Teicoplanin
- Daptomycin
- Trimethoprim-sulfamethoxazole
- Gentamicin & Netilmicin

Some Resistance:

- Erythromycin
- Tetracycline
- Chloramphenicol

Clinical Implications

This pattern of intrinsic glycopeptide resistance is highly unusual among Gram-positive bacteria.

Empiric Vancomycin Will Fail

Vancomycin is commonly used empirically; consider alternative agents for suspected Erysipelothrix.

Beta-Lactam Therapy Is the Cornerstone of Treatment Across All Disease Syndromes

Localised Erysipeloid

(No Systemic Features)

- **First-line:** oral penicillin (phenoxymethylpenicillin) or amoxicillin for 7–10 days.
- **Penicillin-allergic alternatives:** first-generation cephalosporins, clindamycin, or fluoroquinolones.
- Many mild cases resolve without therapy; however, treatment reduces duration and risk of progression.

Diffuse & Systemic Disease

- **Parenteral therapy required:** IV penicillin G or ceftriaxone.

Endocarditis & Osteo-Articular

- **4–6 weeks (or longer)** of bactericidal beta-lactam therapy.
- Surgical intervention is often required for valve or bone/joint complications.

Empiric Therapy Consideration

Given the intrinsic vancomycin resistance of *Erysipelothrix*, standard empiric regimens for Gram-positive infections may fail.

> *In at-risk patients (e.g., fish handlers with bacteremia and negative Gram stain), empiric regimens should include a* ***beta-lactam active against Erysipelothrix*** *until the organism is excluded or identified.*

Five Facts About Erysipelothrix That Every Clinician Must Know

1

Zoonosis associated with fish, swine, and poultry — fish handling is the classic exam scenario.

2

Gram-positive, non-motile, catalase-negative, alpha-haemolytic rod in the family Erysipelotrichaceae.

3

Intrinsically resistant to vancomycin — empiric vancomycin will fail; use beta-lactams.

4

Three clinical syndromes: localised erysipeloid (most common), diffuse cutaneous disease, and systemic infection/endocarditis.

5

Diagnosis: full-thickness lesion biopsy; blood culture + ECHO if systemic disease suspected; MALDI-TOF for identification.

Treatment of Choice

Penicillin or amoxicillin *(oral for localised; IV for systemic). Always avoid glycopeptides.*