

Upper Airways

Inflammatory Lesions

Laryngitis | Laryngoepiglottitis | Croup | Tobacco-associated injury

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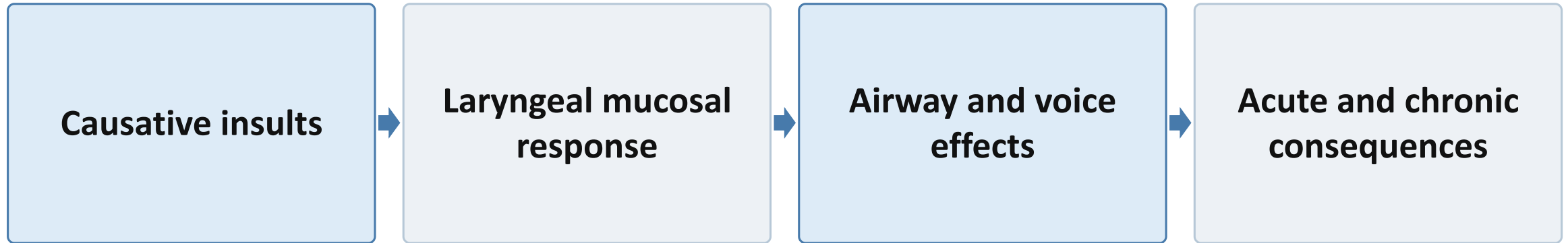
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Learning objectives

- Identify infectious and noninfectious triggers of laryngeal inflammation.
- Explain congestion, exudation, and edema as causes of airway compromise.
- Distinguish acute laryngoepiglottitis from viral croup conceptually.
- Connect chronic tobacco exposure to squamous metaplasia and cancer risk.

The teaching scope: Inflammation of the larynx

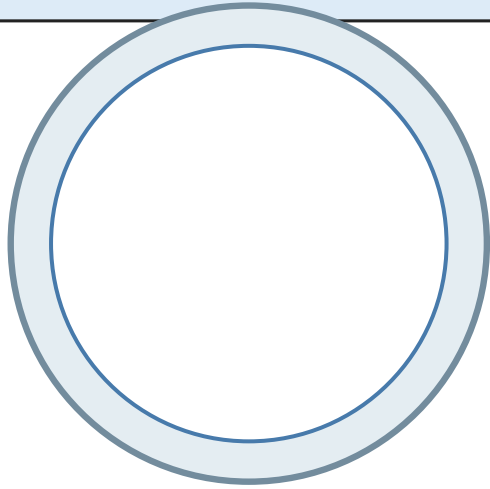


The original subsection is in the LARYNX parent context; Pharyngitis and tonsillitis belong to a separate earlier topic.

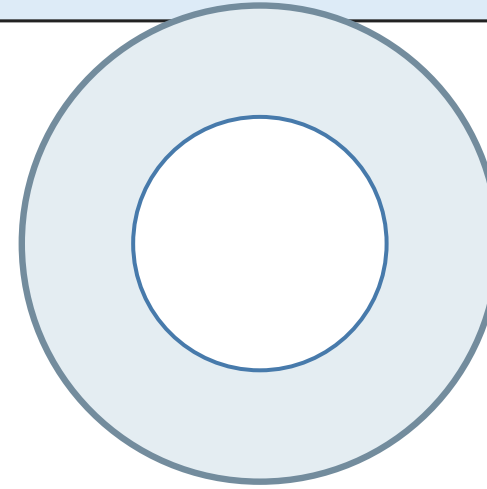
The larynx: An airway with functional constraints

- The airway must remain patent despite a narrow mucosal-lined passage.
- Epiglottic and vocal-fold swelling has implications beyond local inflammation.
- A small reduction in effective lumen is especially important in children.

Why mucosal swelling matters



Larger patent lumen



Reduced patent lumen

1. The relevant clinical variable is the residual air passage.
2. Edema and exudate encroach on an already limited lumen.
3. Anatomic site and patient age change clinical consequences.

The etiologic spectrum is broader than infection

Trigger class	Examples named in Robbins	Pattern of injury
Infectious	Viruses; bacteria	Direct or associated inflammatory insult
Allergic	Allergic insult	Inflammatory mucosal swelling
Chemical / environmental	Tobacco smoke; toxins	Irritant-related laryngeal injury
Reflux-related	Gastric contents	Chemical irritation from reflux

Isolated versus associated laryngitis

Isolated laryngeal illness

- An allergic, viral, bacterial or chemical insult may predominantly involve the larynx.
- Local symptoms do not require simultaneous widespread URI involvement.

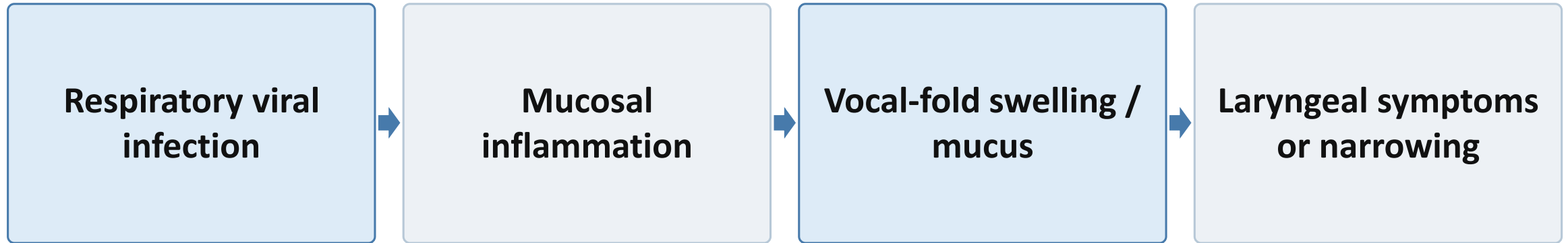
Part of a broader process

- More commonly accompanies a generalized upper respiratory infection.
- May accompany heavy smoke/toxin exposure or gastroesophageal reflux.

Viral triggers: The infectious setting

- Viral injury may occur within a generalized upper respiratory tract infection.
- Viral inflammation can lead to hyperemia, mucosal swelling and secretion.
- Inflammatory involvement of the vocal cords contributes to airway narrowing.

Viral upper respiratory infection → laryngeal disease



Mechanistic synthesis of Ch16 and Ch15; Not a virus-specific diagnostic algorithm.

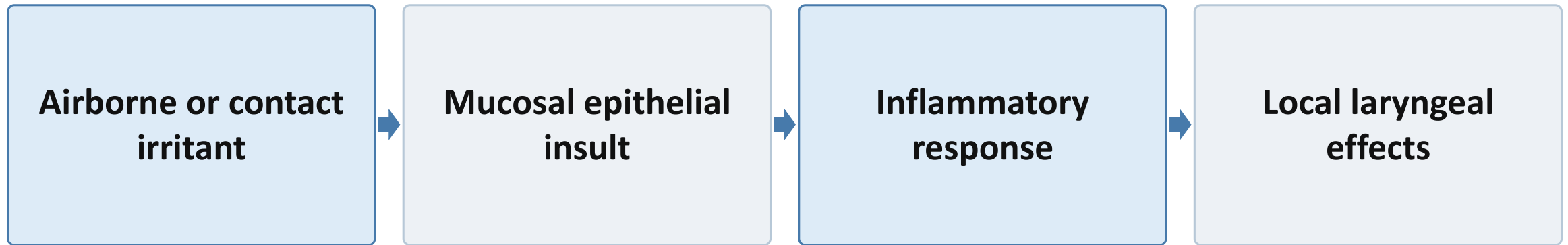
Bacterial triggers: Local or systemic involvement

- Bacteria are among the named primary causes of laryngitis.
- H. Influenzae and β -hemolytic streptococci are specifically linked to laryngoepiglottitis.
- Diphtheria is named as a systemic infection that can affect the larynx.

Allergic laryngitis: The central pathologic issue

- An allergic insult can inflame laryngeal mucosa without primary infection.
- The clinically relevant tissue response is swelling at a constrained airway site.
- The etiologic distinction matters even when congestion and edema are shared.

Chemical exposure → inflammation



Tobacco smoke is the explicit example of heavy environmental toxin exposure.

Tobacco smoke: Acute and recurrent irritation

- Heavy environmental toxin exposure is associated with laryngitis.
- Chronic smoking is emphasized as a setting for recurrent laryngeal inflammation.
- The long-term consequence extends beyond transient mucosal symptoms.

Gastroesophageal reflux as a laryngeal insult

- Reflux brings gastric contents into contact with susceptible upper airway mucosa.
- This as chemical irritation associated with laryngitis.
- The disease mechanism differs from respiratory microbial infection.

Smoke and reflux: Distinct routes to irritation

Inhaled exposure

- Environmental toxins contact the airway lining.
- Tobacco smoke is a named example.
- Repeated exposure is linked to epithelial adaptation.

Reflux exposure

- Gastric contents provide the irritant.
- Irritation may involve the larynx.
- The same site can be inflamed without respiratory infection.

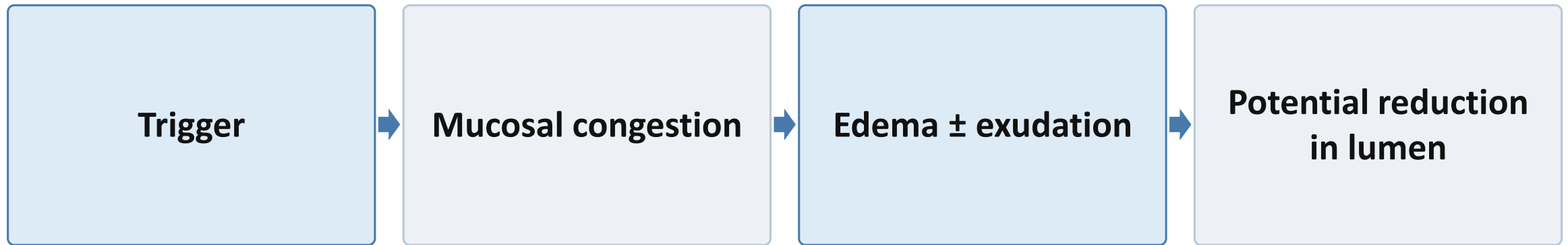
Systemic infections can involve the larynx

- Tuberculosis is specifically identified as a systemic infection with laryngeal involvement.
- Diphtheria is also named among systemic infections involving the larynx.
- The presence of laryngeal inflammation alone does not identify its pathogen.

What the source establishes—and does not establish

Named condition	Explicit statement	Avoid inferring
Tuberculosis	Larynx may be affected	A particular biopsy appearance from this passage
Diphtheria	Larynx may be affected	A specific membrane architecture not described here
Allergic laryngitis	Possible allergic etiology	An immunologic laboratory cutoff
Reflux-associated laryngitis	Irritation by gastric contents	A laryngoscopic diagnostic criterion

Acute mucosal inflammation: Pathologic sequence



Congestion, exudation, edema and obstruction are directly joined in Ch16.

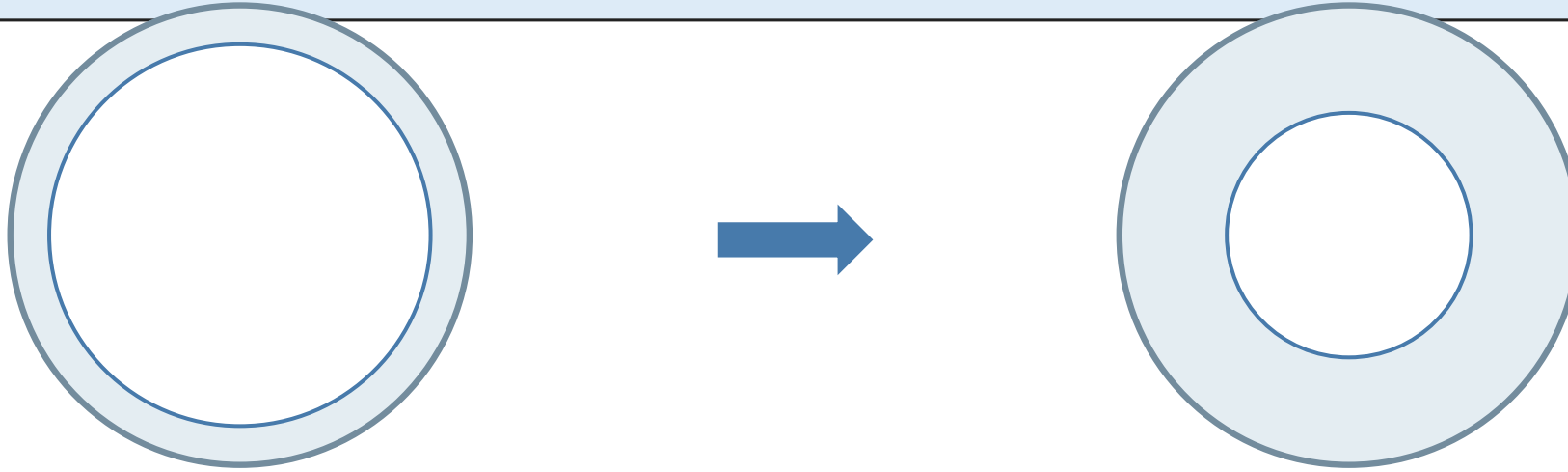
Congestion: Vascular contribution to swelling

- Congestion increases blood content of the involved mucosal vascular bed.
- The passage specifically names mucosal congestion as part of obstructive laryngeal disease.
- Congestion can coexist with edema and secretion at the same anatomic site.

Edema: Expansion of the laryngeal mucosa

- Fluid accumulation increases the thickness of the mucosal tissue.
- Thickness matters because the effective airway is bounded by mucosal surfaces.
- Rapid swelling can create an acute threat before prolonged tissue remodeling occurs.

Schematic: Lumen loss caused by edema



Larger patent lumen

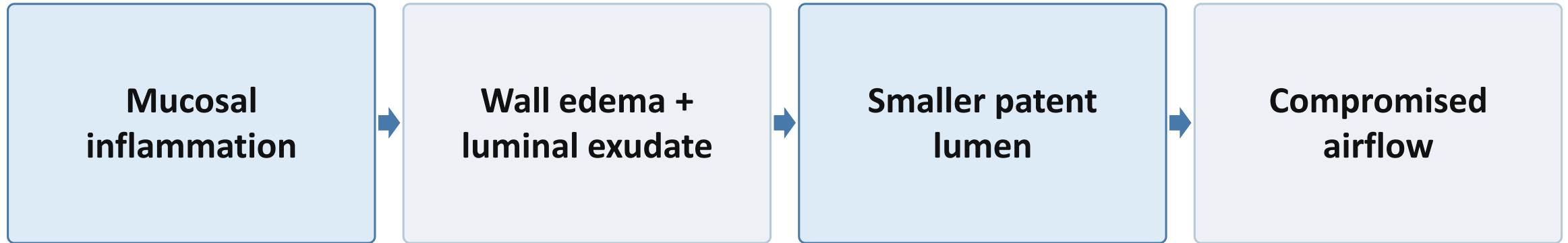
Reduced patent lumen

1. A constant outer airway diameter can conceal a markedly smaller open lumen.
2. The illustration is qualitative: It implies no clinical threshold.
3. The functional consequence is resistance to movement of air.

Exudation: Luminal material adds to narrowing

- Inflammatory exudation may accompany mucosal congestion and edema.
- Material at the surface occupies part of the airway space.
- Tissue swelling and luminal secretions may act together.

Two routes to a smaller functional airway



Arrows here show a combined functional pathway rather than an exact temporal sequence.

Vocal-fold swelling is clinically important

- The vocal folds form an essential part of the laryngeal air passage.
- Ch16 names sudden vocal-cord swelling in laryngoepiglottitis.
- Vocal-fold involvement can alter phonation and contribute to obstructed inspiration.

Epiglottic swelling: A critical airway site

- The epiglottis is specifically identified as an affected structure in laryngoepiglottitis.
- Sudden edema near the laryngeal opening can create rapid obstruction.
- The important diagnostic concept is an inflamed airway entrance, not just sore throat.

Mucosal disease versus airway emergency

Localized inflammatory disease

- Inflammation can occur with an airway that remains sufficiently patent.
- Many episodes are described as self-limited.

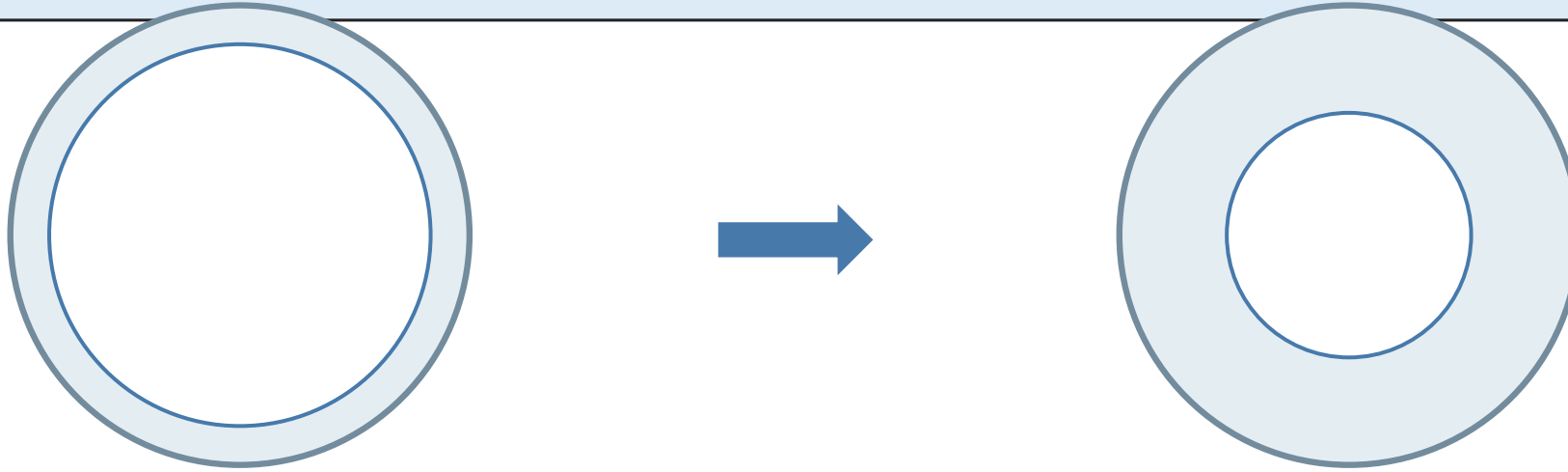
Obstructive inflammatory disease

- Swelling or exudation reduces residual airflow space.
- Sudden obstruction in a small pediatric larynx may become an emergency.

Most episodes resolve; Anatomy determines danger

- The textbook explicitly notes that most laryngeal infections are self-limited.
- Severity changes if edema, congestion or exudation narrows the airway.
- Children have less anatomical reserve than adults for the same injury pattern.

Schematic: Pediatric versus adult airway reserve



Adult: Larger lumen (schematic)

Child: Smaller lumen (schematic)

1. A small absolute decrease in lumen has more consequence in a narrower airway.
2. The textbook also mentions stronger accessory respiratory muscles in adults.
3. This is a qualitative comparison; Circle diameters are illustrative.

Why obstruction is less common in adults

Children

- Narrower laryngeal lumen.
- Sudden swelling can produce critically reduced space.
- Smaller functional respiratory reserve.

Adults

- Larger laryngeal lumen.
- Greater allowance for an equivalent amount of swelling.
- Stronger accessory respiratory muscles.

The pediatric obstruction cascade

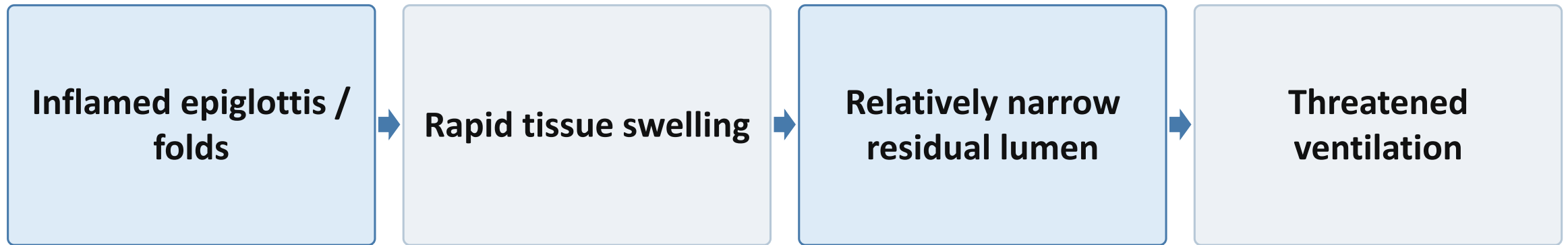


Diagram is a pathology-driven explanation rather than clinical triage advice.

Pediatric airway disease: Key danger signal

- The decisive complication in the excerpt is obstruction of the larynx.
- An inspiratory noise may reflect a narrowed upper airway.
- Sudden airway compromise constitutes an emergency, irrespective of presumed pathogen.

Laryngoepiglottitis: An inflammatory emergency

Sudden swelling of the epiglottis and vocal cords

- Occurs particularly in infants and young children with small airways.
- Named infectious associations: RSV, H. Influenzae and β -hemolytic streptococci.
- The danger is acute mechanical obstruction, not merely local pain.

Pathogens named in laryngoepiglottitis

Named association	Agent category	Core inference
Respiratory syncytial virus	Virus	An infectious trigger of serious airway swelling
Haemophilus influenzae	Bacterium	A named possible cause of this emergency
β -hemolytic streptococci	Bacterial group	Another named possible cause

Respiratory syncytial virus in this section

- RSV is directly listed among causes of laryngoepiglottitis.
- The chapter also emphasizes prevention of RSV-associated serious complications.
- RSV-related swelling is clinically important because of the pediatric airway caliber.

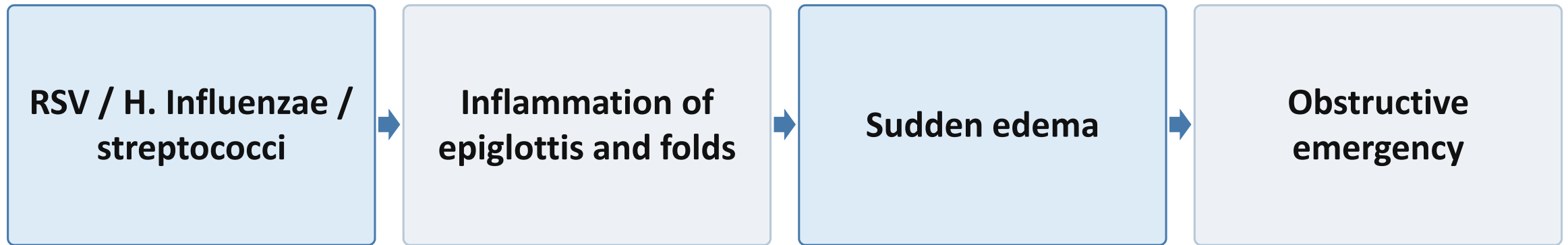
Haemophilus influenzae in this section

- H. Influenzae is directly linked to laryngoepiglottitis in the chapter.
- Severe edema of the epiglottis and vocal folds may follow.
- Effective H. Influenzae immunization has reduced this severe complication.

β -Hemolytic streptococci in this section

- β -hemolytic streptococci among pathogens causing laryngoepiglottitis.
- The relevant shared endpoint is rapidly progressive laryngeal swelling.
- The paragraph does not specify streptococcal group, frequency or clinical scoring rules.

Multiple pathogens converge on one acute outcome



Convergence is mechanistic; Pathogens need not share identical molecular pathogenesis.

Preventive immunization changes disease risk

- A substantial reduction in severe pediatric complications through prevention.
- It specifically identifies prevention directed at H. Influenzae and RSV.
- Preventive modalities and population eligibility should be checked against local current policies.

Prevention is distinct from acute airway assessment

Risk reduction

- Population immunization can decrease severe infectious complications.
- It acts before the acute episode.

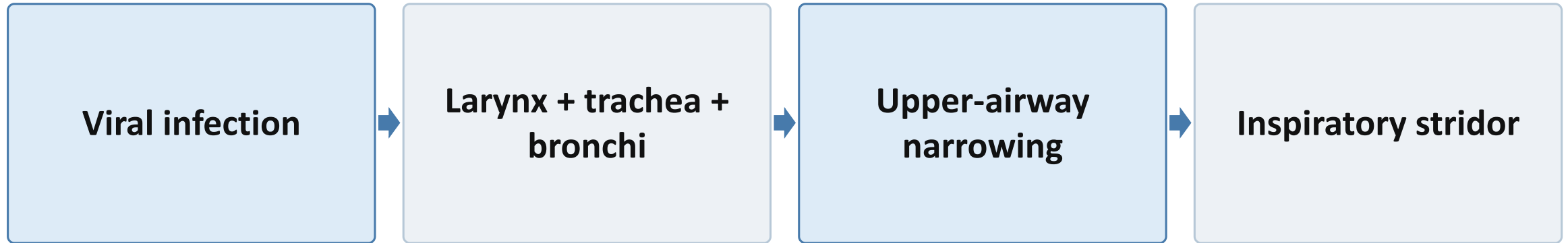
Immediate illness

- An obstructed pediatric airway is still an emergency.
- Etiologic assumptions cannot substitute for recognizing obstruction.

Croup: The term has a specific modern meaning

- Croup now generally denotes viral laryngotracheobronchitis in children.
- It was historically used for diphtheria; That usage is no longer the standard meaning.
- Its hallmark mechanism in this section is narrowing of the upper airway.

Croup: Anatomic extent and consequences

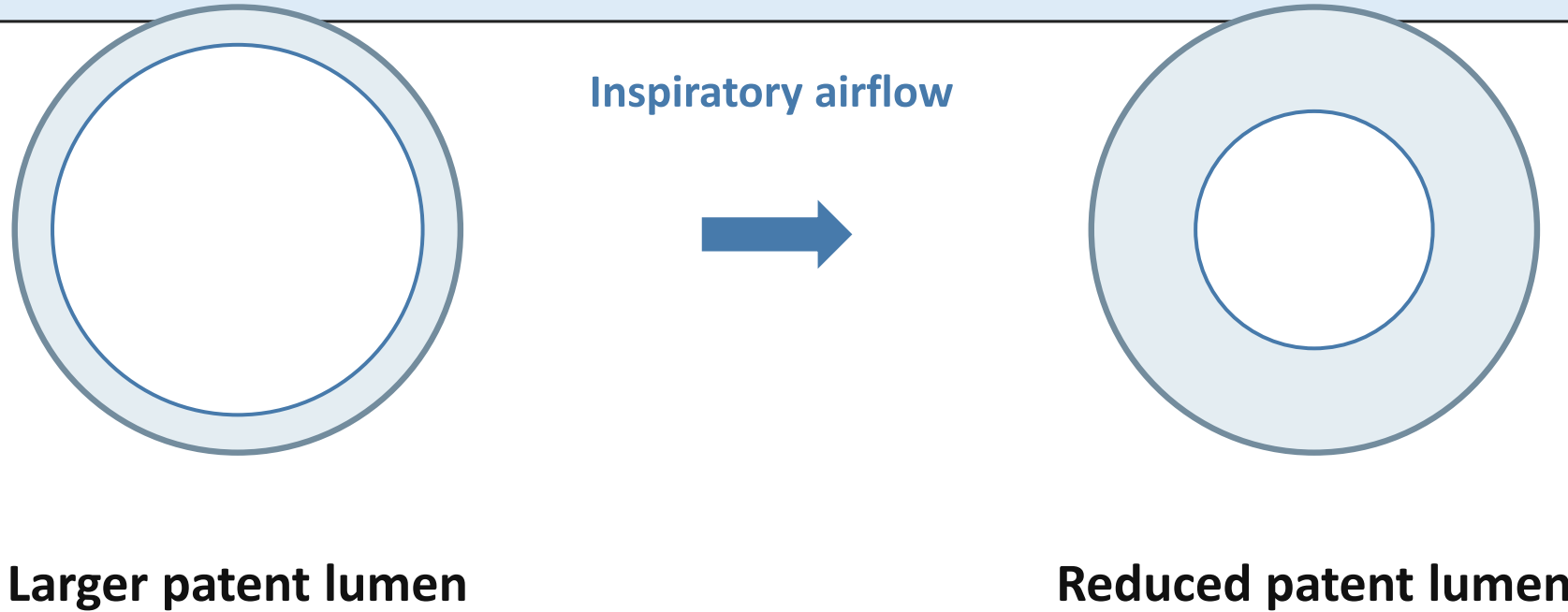


The compound term is not merely “laryngitis”; It names contiguous airway regions.

Inspiratory stridor: An airflow consequence

- Croup produces characteristic inspiratory stridor.
- The sound reflects turbulent airflow through a narrowed upper airway.
- Stridor is a physiological sign of narrowing, not direct proof of one pathogen.

Schematic: Narrowing and inspiratory airflow



1. Air must traverse a smaller opening in the inflamed upper airway.
2. Inspiratory stridor is the named clinical manifestation in croup.
3. Illustration conveys direction and narrowing, not measured flow velocity.

Croup versus laryngoepiglottitis

Viral croup

- Viral laryngotracheobronchitis in children.
- Characteristic inspiratory stridor.
- Airway narrowing is central.

Laryngoepiglottitis

- Epiglottis and vocal cords swell suddenly.
- RSV, H. Influenzae and streptococci are named.
- Acute obstruction is a medical emergency.

Three ways the term “laryngeal inflammation” is used

Pattern	Anatomic focus	Clinical emphasis
Laryngitis	Laryngeal mucosa	Broad infectious or noninfectious insults
Laryngoepiglottitis	Epiglottis and vocal folds	Sudden swelling / pediatric danger
Croup	Larynx, trachea and bronchi	Viral illness with inspiratory stridor

Historical terminology: Croup and diphtheria

- The historical term “croup” was previously associated with diphtheria.
- Robbins assigns its usual contemporary meaning to viral laryngotracheobronchitis.
- Diphtheria remains separately named as a systemic infection affecting the larynx.

Viral airway morphology: Additional Robbins context

- Upper respiratory viral infections cause mucosal hyperemia and swelling.
- Submucosal mononuclear cells and increased mucus are described.
- Viral laryngotracheobronchitis features vocal-cord swelling and abundant mucus.

Structural and functional correlates of viral injury

Morphologic finding	Expected local effect	Teaching implication
Hyperemia	Increased mucosal blood content	Congestion may accompany swelling
Mucosal swelling	Narrower effective passage	Pediatric compromise is more likely
Abundant mucus	More material within airway	Airway narrowing has a luminal component
Vocal-fold edema	Altered glottic passage	Airflow and phonation may be affected

Why vocal-fold disease can alter the voice

Inflammation involves an organ specialized for phonation

- The vocal folds contribute to production of the normal voice.
- Tissue swelling can alter the mechanical configuration of the vibrating fold.
- Voice change is understandable without attributing it to malignancy.

Acute inflammation versus structural neoplasia

- An inflammatory laryngeal symptom does not itself establish a tumor.
- The parent section states that inflammatory disorders are common and laryngeal tumors uncommon.
- Chronic tobacco exposure is relevant because it also predisposes to carcinoma over time.

Chronic smoke exposure: Pathological continuity



A risk association is not a deterministic progression.

Metaplasia: The underlying adaptation

- Metaplasia is replacement of one differentiated cell type by another.
- In the respiratory tract, chronic irritation may favor squamous differentiation.
- The change as an adaptive but often undesirable response.

Why squamous change can be advantageous yet costly

Adaptive advantage

- Squamous lining is better able to withstand repeated irritant injury.
- This explains selection of a more durable epithelial phenotype.

Functional disadvantage

- Specialized mucociliary defense can be diminished.
- Loss of ciliated epithelial function may increase vulnerability to infection.

Metaplasia is not synonymous with carcinoma

- Metaplasia is an adaptive epithelial phenotype change.
- A carcinoma represents a malignant epithelial neoplasm.
- Tobacco-related laryngitis as a setting predisposing to both metaplasia and carcinoma.

Common language that must not be conflated

Term	Meaning in this lecture	What it does not establish
Laryngitis	Inflammatory condition	A specific infectious organism
Metaplasia	Change in mature epithelial differentiation	Malignancy by itself
Laryngeal carcinoma	Malignant neoplasm	An inevitable outcome of laryngitis
Stridor	Airflow disturbance from narrowing	The exact anatomic/pathogen diagnosis

Recurrent laryngeal symptoms: Separate processes

- Smoke-related chronic irritation and reflux-related irritation are noninfectious possibilities.
- An upper respiratory infection may also cause an acute episode.
- The source does not provide a rule that identifies etiology from symptom duration alone.

Inflammatory lesions versus reactive vocal-cord nodules

Inflammatory lesions (this topic)

- May follow infection, allergen, irritant or reflux.
- May threaten airway patency in severe pediatric disease.

Reactive nodules (adjacent topic)

- Associated with voice strain and smoking.
- Discrete vocal-cord nodules/polyps are a distinct lesion category.

Case 1: Uncomplicated inflammatory context

Clinical vignette

A patient develops transient laryngeal symptoms during a generalized upper respiratory tract infection. There is no evidence in the stem of threatened ventilation.

Which etiologic setting fits the common presentation?

Case 1: Interpretation

URI-associated laryngitis

- Laryngitis more commonly occurs as part of an upper respiratory infection.
- Viral mechanisms can produce mucosal hyperemia, swelling and secretions.
- The absence of obstruction in the stem does not determine the exact pathogen.

Case 2: Pediatric airway threat

Clinical vignette

A young child has abrupt upper-airway compromise attributed to marked swelling near the epiglottitis and vocal cords.

Which named inflammatory syndrome and immediate pathophysiologic danger are suggested?

Case 2: Interpretation

Laryngoepiglottitis with potentially obstructive edema

- Epiglottic and vocal-fold swelling as the critical lesion.
- The small pediatric airway magnifies the effect of sudden swelling.
- This is a medical emergency; Microbial identity is not inferred from the stem.

Case 3: Inspiratory stridor

Clinical vignette

A child has viral inflammation described as laryngotracheobronchitis, accompanied by a characteristic inspiratory noise.

What name and mechanism does Robbins use for this syndrome?

Case 3: Interpretation

Croup: Viral laryngotracheobronchitis

- The anatomic term encompasses larynx, trachea and bronchi.
- Inflammatory airway narrowing is linked to inspiratory stridor.
- The older equation of “croup” with diphtheria should not be used.

Case 4: Repeated tobacco exposure

Clinical vignette

An adult with heavy tobacco-smoke exposure has recurrent laryngeal inflammation.

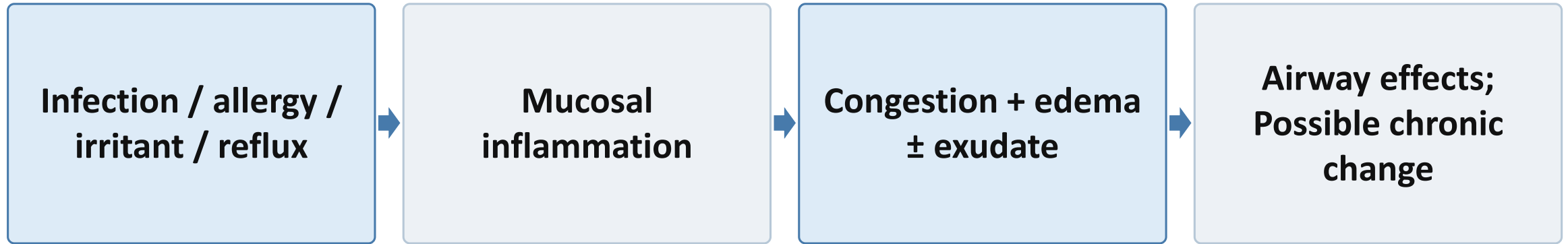
Which epithelial adaptation and long-term risk are emphasized?

Case 4: Interpretation

Squamous metaplasia and predisposition to carcinoma

- Persistent irritation can favor squamous epithelial metaplasia.
- Metaplasia is not itself evidence of carcinoma.
- The textbook associates chronic smoking-related laryngitis with carcinoma risk.

Integrated mechanism: From cause to consequence



Acute obstruction and chronic epithelial metaplasia are distinct possible endpoints.

The main clinical-pathologic discriminators

Situation	Characteristic association	Priority concept
Typical acute infection	Often part of generalized URI	Inflammation may be self-limited
Pediatric laryngoepiglottitis	Sudden epiglottic / vocal-fold edema	Possible emergency obstruction
Croup	Viral laryngotracheobronchitis	Inspiratory stridor from narrowing
Chronic smoke-related laryngitis	Repeated irritant exposure	Squamous metaplasia; cancer association

Four high-yield conclusions

- Laryngitis may be infectious, allergic, chemical, reflux-related or part of systemic infection.
- Congestion, exudation and edema explain the acute threat of luminal narrowing.
- Pediatric epiglottic/vocal-fold swelling can rapidly become a medical emergency.
- Croup is viral laryngotracheobronchitis; Tobacco irritation has chronic epithelial risks.

Selected primary sources

- Robbins, Cotran & Kumar. Pathologic Basis of Disease. 11th edition (2026).
- Core reading: inflammatory lesions of the larynx in the head-and-neck chapter.
- Supporting reading: respiratory viral infection and airway morphology.
- Supporting reading: metaplasia and respiratory epithelial adaptation.

Original explanatory diagrams are native editable PowerPoint constructions; no textbook clinical images reproduced.