



Pictorial View - Signs In Chest X-Rays

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ABSTRACT

A radiological sign can sometimes resemble a particular object pattern and is often highly suggestive of a group of similar pathologies. Awareness of such signs can help to find the differential diagnosis list. Many such signs have been described for X-ray and computed tomography (CT) images. In this article, we present the most frequently encountered plain film in chest imaging. These signs include for plainfilms the air bronchogram sign, silhouette sign, deep sulcus sign, Continuous diaphragm sign, air crescent ("meniscus") sign, Golden S sign, cervicothoracic sign, Luftsichel sign, scimitar sign, doughnut sign, Hampton hump sign, Westermarks sign, and juxtaphrenic peak sign.

KEYWORDS

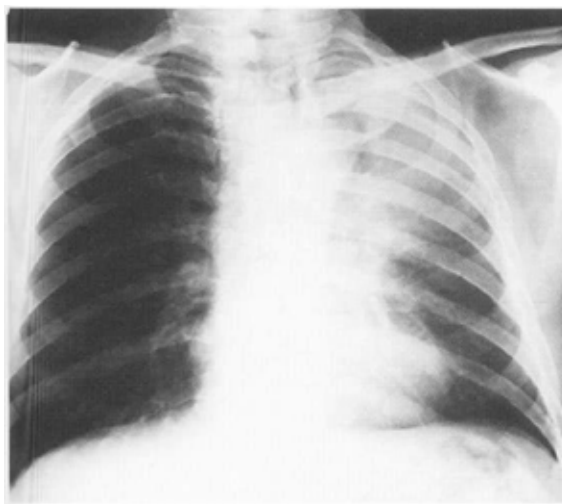


Fig : Left upper lobe collapse with loss of outline of left upper heart border



Figure : Hilum overlay sign seen on left side

Silhouette sign

Failure to visualise the border of normally visualized anatomical structure shows that the area neighbouring this margin is filled with tissue or material of the same density. The silhouette sign is an important sign indicating the localization of a lesion. It reliably distinguishes anterior and posterior lung lesions. When two objects same density touch each other the margin between them disappears.

Hilum Overlay Sign

Silhouette sign of the hila is called the "hilum overlay sign". It is used to determine localization of a lesion in the hilar region in chest X-rays. If hilar vessels can clearly be seen inside the lesion, the lesion is either anterior or posterior to the hilum. If the hilar vessels can not be discriminated from the lesion, the lesion is at the hilum.

Lesion Silhouettes	Localisation of lesions
Left Cardiac Border	Lingula
Aortic Knuckle	Apico-posterior segment of left UL
Hemi Diaphragm	Basal Segment of LL
Right Heart border	Right ML
Descending Aorta	Left LL



Hilum Convergence Sign

Used to distinguish between a prominent hilum and an enlarged pulmonary artery. If branches of PA converge toward central mass, it is an enlarged PA. If branches of PA converge toward heart rather than mass is a mediastinal tumor.

Figure : Suggestive of Hilum overlay sign on right side



Figure : Cervicothoracic Sign

Cerviothoracic sign

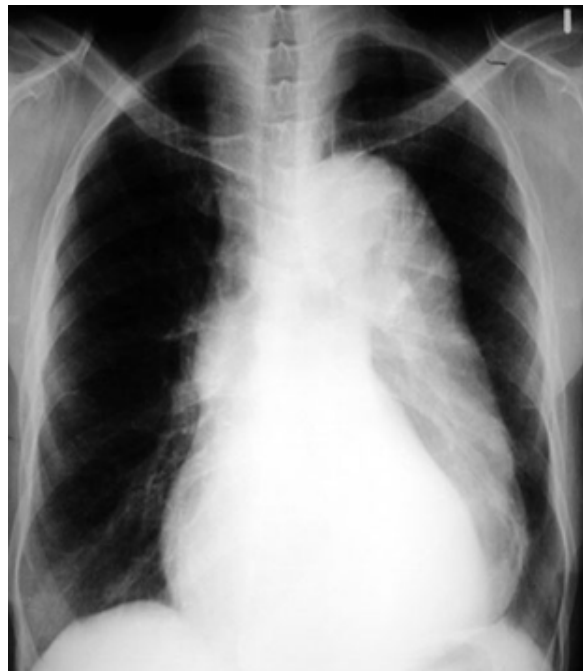
Used to determine location of mediastinal lesion in the upper chest. Based on principle that an intrathoracic lesion in direct contact with soft tissues of the neck will not be outlined by air. Uppermost border of the anterior mediastinum ends at level of clavicle. Middle and posterior mediastinum extends above the clavicles. Mediastinal mass projected superior the level of

clavicles must be located either within middle or posterior mediastinum. More cephalad the mass extends the most posterior or the location



Thoraco abdominal sign

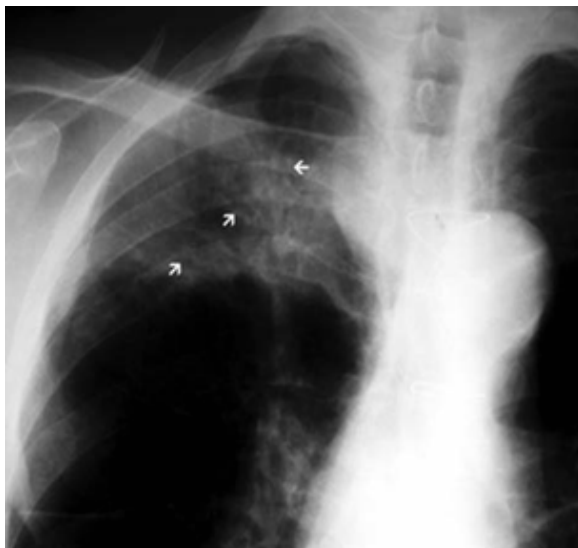
Posterior costophrenic sulcus extends more caudally than anterior basal lung. Lesion extends below the dome of diaphragm must be in posterior chest whereas lesion terminates at dome must be anterior



Pulmonary artery Overlay sign

This is the same concept as a silhouette sign. If you can recognize the interlobar pulmonary artery, it means that the mass seen is either in front of or behind it.

Figure : This is an example of a dissecting aneurysm



Air Bronchogram Sign

Air filled bronchi become visible as a result of opacification of the surrounding lung parenchyma. Branching, tubular leucencies of bronchi are seen in an opacified lung. This sign shows that the pathology is in the lung parenchyma itself .

Figure : Right upper zone consolidation showing air bronchograms

Air bronchogram sign is most frequently encountered in pneumonic consolidation and pulmonary edema. Its generalized form can be seen in respiratory distress syndrome/HMD. The air bronchogram sign shows that the central bronchi are not obstructed. However, it can also be seen when a mass causes half-obstruction.

Differential Diagnosis: 1)Bronchioalveolar carcinoma 2)Lymphoma 3)Interstitial fibrosis 4)Alveolar hemorrhage 4) Sarcoidosis

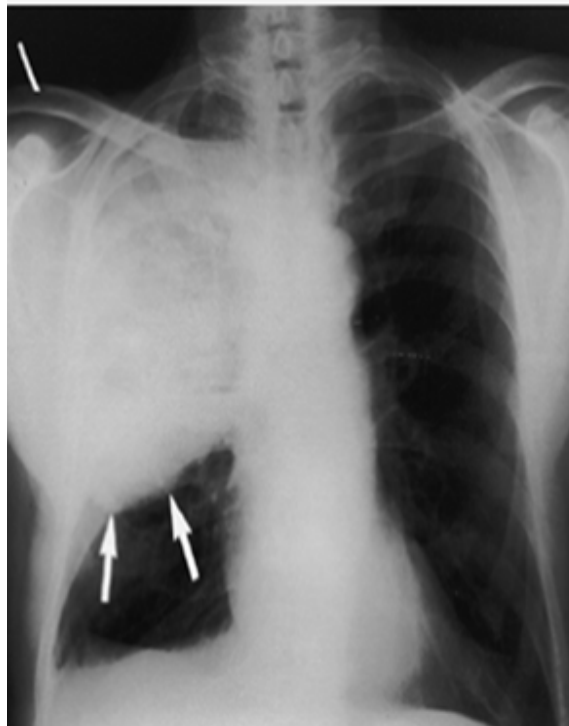


Bat's wings or butterfly appearance

Ground glass appearance or generalised homogenous haze with a perihilar distribution & sparing of peripheral lung.

D/D

1)Pulmonary edema 2) Pneumocystis infection 3)Alveolar proteinosis 4) Alveolar cell Ca 5)Good Pasture's Synd.



Bulging Fissure Sign

Consolidation spreading rapidly, causing lobar expansion and bulging of the adjacent fissure inferiorly.

Klebsiella pneumoniae involving the right upper lobe. Friedlander pneumonia

Signs of Loss of Volume :

Direct Signs :

- Opacity of affected lobe
- Crowding of vessels and bronchi within collapsed area.
- Displacement of fissure

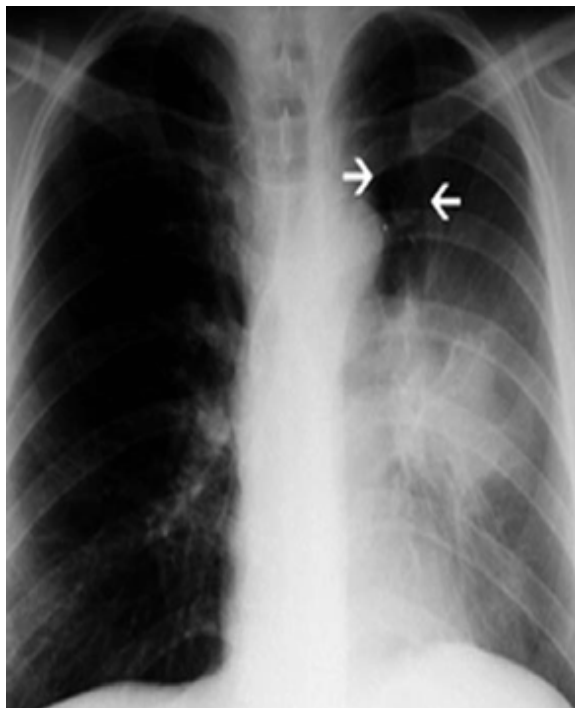
Indirect signs :

- Compensatory hyperinflation of normal lung
- Displacement of mediastinal structures towards affected side
- Displacement of ipsilateral hilum which changes shape
- Elevation of ipsilateral hemidiaphragm
- Crowding of ribs on affected side (common in children)



Golden S sign (Reverse S sign)

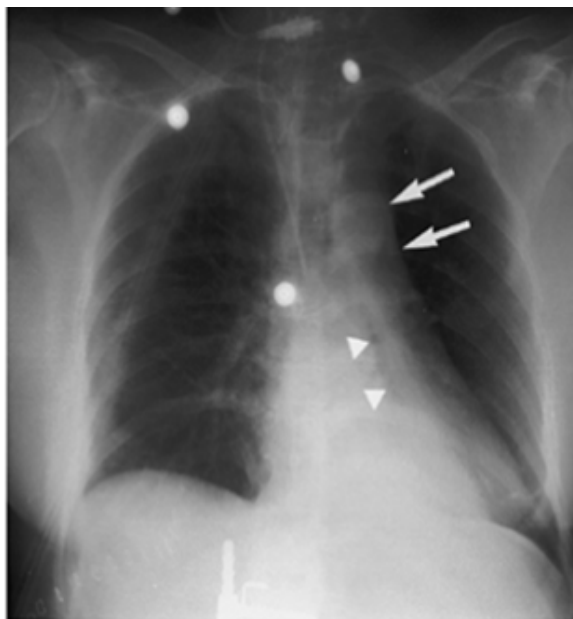
The golden's sign is encountered when there is right upper lobe atelectasis due to a centrally located mass. The minor fissure migrates superiorly, and a "reversed S" shape containing mass forms. The superiorly displaced, lateral and concave portion of the "S" is formed by the minor fissure. The inferiorly and medially located convex part is formed by the margin of the mass. This sign is an important clue indicating a central mass obstructing the bronchus.



Juxtaphrenic Peak Sign

The juxtaphrenic peak sign occurs in upper lobe atelectasis. It describes the triangular opacity projecting superiorly at the medial half of the diaphragm. It is most commonly related to the presence of an inferior accessory fissure.

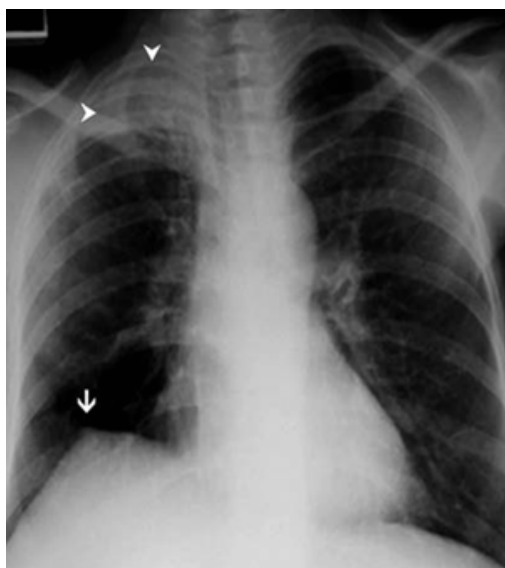
Mechanism of Juxtaphrenic peak sign is not known with certainty; According to one theory, the negative pressure of upper lobe atelectasis causes upward retraction of the visceral pleura, and protrusion of extrapleural fat into the recess of the fissure is responsible. The juxtaphrenic sign can also be seen in combined right upper and middle lobe volume loss or even with middle lobe collapse only.



Luftsichel Sign

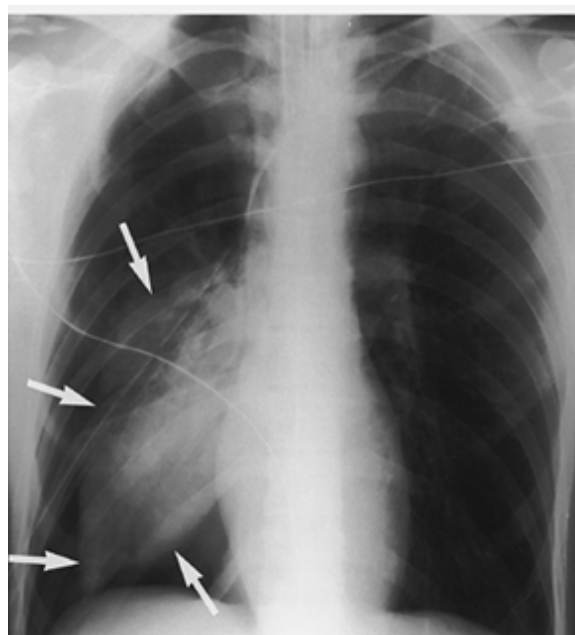
The word "Luftsichel" in German means "air crescent". This sign is seen in severe left upper lobe collapse. Due to the lack of a minor fissure on the left side, upper lobe collapse causes vertical positioning and anterior and medial displacement of the major fissure. The superior segment of the left lower lobe migrates superior and anteriorly between the arch of the aorta and the atelectatic lobe.

Fig : The crescent-shaped radiolucency around the aortic arch is called the Luftsichel sign.



Flat Waist Sign

This sign refers to flattening of the contours of the aortic knob and adjacent main pulmonary artery. It is seen in severe collapse of the left lower lobe and is caused by leftward displacement and rotation of the heart.



Fallen Lung Sign

This sign refers to the appearance of the collapsed lung occur-

ring with a fractured bronchus . The bronchial fracture results in the lung to fall away from the hilum, inferiorly and laterally in an upright patient.

DD:

Pneumothorax causes a lung to collapse inward toward the hilum



Bowing Sign

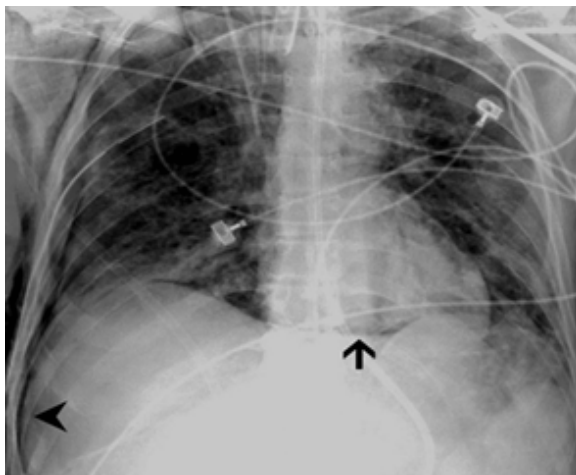
In LUL atelectasis or following resection, as in this case, the oblique fissure bows forwards (lateral view).

The arrow points to the forward movement of the left oblique fissure.



**Open Bronchus Sign
Alveolar Atelectasis**

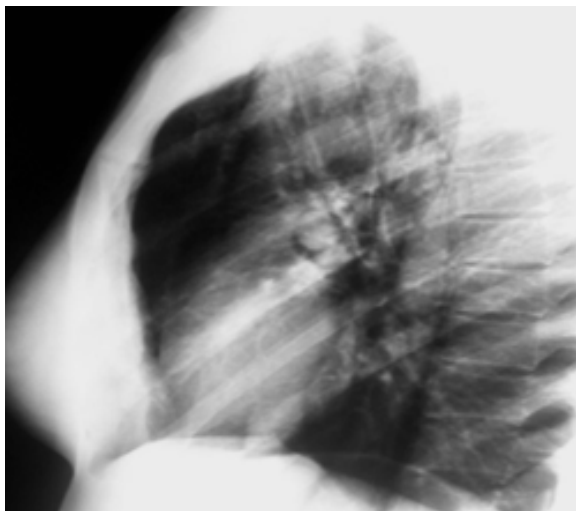
The right lung is atelectatic. You can see air bronchogram, which indicates that the airways are patent. This case is an example of adhesive alveolar atelectasis.



Deep Sulcus Sign

The deep sulcus sign describes the radiolucency extending from CP angle to the hypochondrium .It indicates possible pneumothorax in chest x-rays obtained in the supine position.

In supine position, the air accumulating at anterior space forms a triangular radiolucency that makes the inferior borders of CP angle conspicuous.



Ring Around Artery Sign

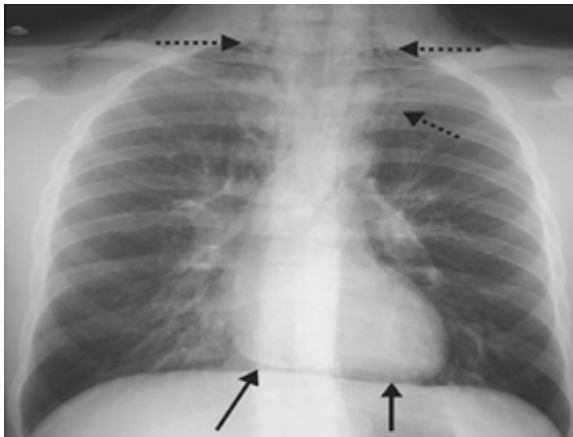
Visualized on lateral chest xray Lucency along or surrounding RPA. Characteristic of pneumomediastinum

Usually is accompanied by other ancillary signs: continuous diaphragm sign, Naclerio's V sign, thymic sail sign



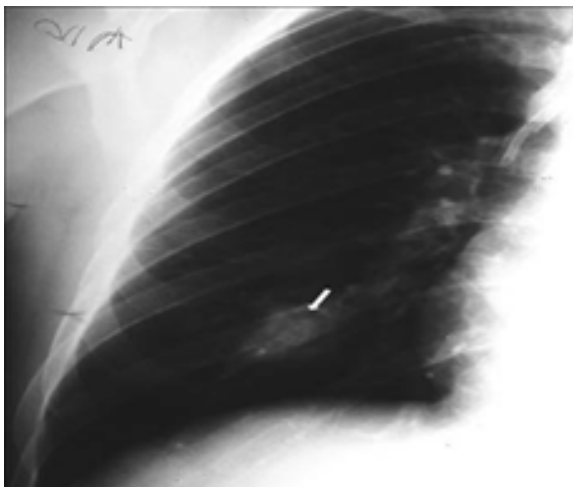
Thymic Sail Sign

Refers to the outlining of normal thymus by air which also elevates the thymus giving it the configuration of a sail; indicates Pneumo mediastinum



Continous Diaphragm Sign

The continuous diaphragm sign occurs as a result of continuation of mediastinal air accumulated at the lower border of the heart with both hemidiaphragms. It is useful in differentiating pneumothorax from pneumomediastinum.

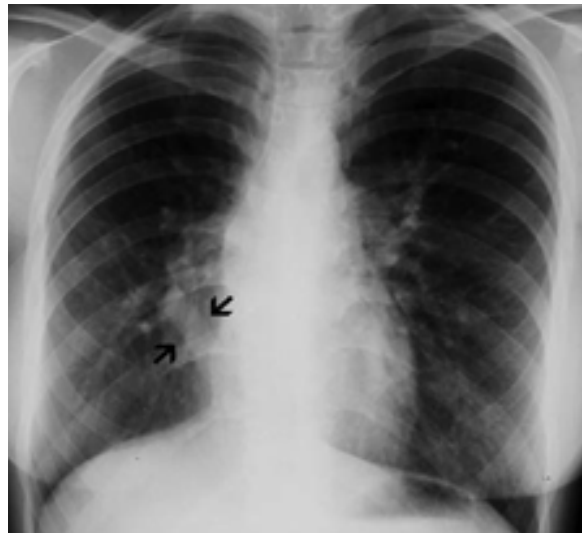


Other causes of the air crescent sign : 1) Intracavitary fungus ball (mycetoma) 2) Hydatid cyst with bronchial involvement 3) Hematoma 4) Abscess 5) Necrotizing pneumonia 6) Cystic bronchiectasis filled with mucus plugs

Air Crescent Sign (“meniscus”) sign

The air crescent (“meniscus”) sign is the result of air accumulation between a mass or nodule and normal lung parenchyma. It is most frequently encountered in neutropenic patients with aspergillosis.

In invasive aspergillosis, nearly 2 weeks after the onset of the infection, neutrophils increase in number and separate necrotic tissue from the normal lung parenchyma. The separated area then fills with air, resulting in the air crescent sign.



Scimitar Sign

A tubular-shaped opacity extending towards the diaphragm along the right side of the heart. The scimitar sign indicates anomalous venous return of the right inferior pulmonary vein (total or segmental) directly to the hepatic vein, portal vein or IVC. The scimitar sign is associated with congenital hypoplastic lung syndrome (scimitar syndrome).



Doughnut Sign

The doughnut sign occurs when mediastinal lymphadenomegaly occurs behind the bronchus intermedius in the subcarinal region. Lymphadenopathy is seen as lobulated densities on lateral radiographs. Pattern is formed by the radiolucent area at the central portion and by the surrounding opacities due to the lymph nodes.



Water Bottle sign
Seen in pericardial effusion



Water Lily Sign

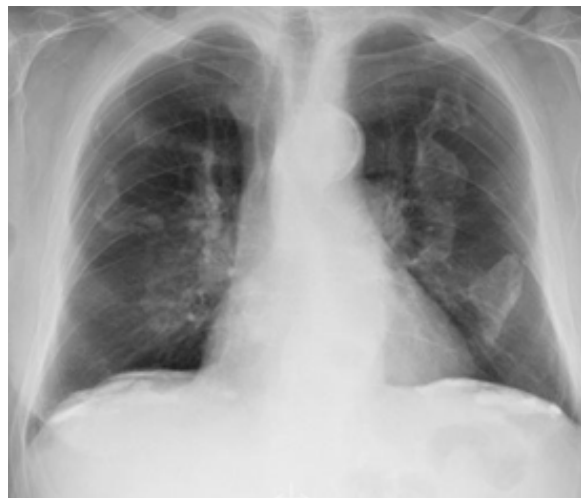
Seen in hydatid infections when there is detachment of endocyst membrane which results in floating membranes within the pericyst that mimics the appearance of a water lily.

classically seen in chest x-ray when collapsed membranes are calcified



Inlet to Outlet shadow

Esophagus, aorta and thoracic duct are three structures that traverse from inlet to outlet of mediastinum. Dilatation of any one of them give rise to inlet to outlet shadows. However the thoracic duct is never large enough to be visible. Inlet to outlet shadow in the mediastinum to right of midline is due to esophageal dilatation. Inlet to outlet shadow in the mediastinum to left of midline is due to dissecting aneurysm.



Holy Leaf Sign

It refers to the appearance of pleural plaques on chest x-rays.

Their irregular thickened nodular edges are likened to the appearance of a holly leaf.



Miliary Pattern

Wide spread small discrete opacities of 2-4mm in diameter.

D/D : TB, Coccidiomycosis, Histoplasmosis, Silicosis, Coal worker's pneumoconiosis

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