



FLEKSİBL FİBEROPTİK BRONKOSKOPİ

DOÇ. DR. ARİF DURAN

ABANT İZZET BAYSAL ÜNİVERSİTESİ TIP FAKÜLTESİ

ACİL TIP ANABİLİM DALI

Bronkoscopi nedir ?

• Solunum yollarının endoskopik olarak incelenmesi

Bronkoskop çeşitleri

- Fiberoptik bronkoskop
- Video Bronkoskop
- Rijit bronkoskop

Bronkoscopi yapılma amaçları

- Tanı amaçlı
- Tedavi amaçlı

RIJIT BRONKOSKOP

- Rijit bronkoskop yaklaşık olarak 40 cm uzunluğunda, bir santimetreden küçük çapta bükülmeyen madeni bir borudan ibarettir.
- Başlangıç kısmında oksijen için bir giriş adaptörü mevcuttur.
- Aydınlatma dışardan gelen güçlü, ayarlanabilir bir kaynak vasıtasıyla yapılır.
- Bu kaynaktan gelen "soğuk ışık" borunun çeperine yerleştirilmiş kuartz çubuğu parlatarak aydınlatmayı sağlar.



RIJIT BRONKOSKOP

- ✓ Proksimal hava yollarının
 - incelenmesine olanak sağlar
- ✓ Çalışma kanalı çok daha geniş
- ✓ Genel anestezi, operasyon
 - salonu, deneyim
- ✓ Daha etkin aspirasyon, daha büyük biyopsi ve
 - daha fazla dokunun uzaklaştırılabilmesi

VIDEO BRONKOSKOP

Video Bronkoscopu modern CCD video ip teknolojisi ve oto-fokus fonksiyonu yksek kalitede grnt almanızı saęlar.

Video bronkoskop tamamen temizleme ve dezenfekten solsyonu ierisine batırılabilir.



FIBEROPTİK BRONKOSKOP



- Fleksibl fiberoptik bronkoskop 1970'te Ikeda tarafından geliştirilmiş olup birçok yerde rijit bronkoskopun yerine kullanılır olmuştur.
- Bu sayede solunum yollarının lokal anestezi altında daha kolay bir metodla incelenmesi mümkün olmuştur.
- Fiberoptik bronkoskop bükülebildiğinden hastaya uygulanması daha kolaydır.

FIBEROPTİK BRONKOSKOP

- ❖ makta
- ❖ Trakea, proksimal havayolları ve segmental havayollarının gözlenmesi daha kolay
- ❖ Hasta yatağı başında bile yapılabilir
- ❖ Lokal anestezi

Fiberoptik Bronkoscopi Avantajları

Kapsam

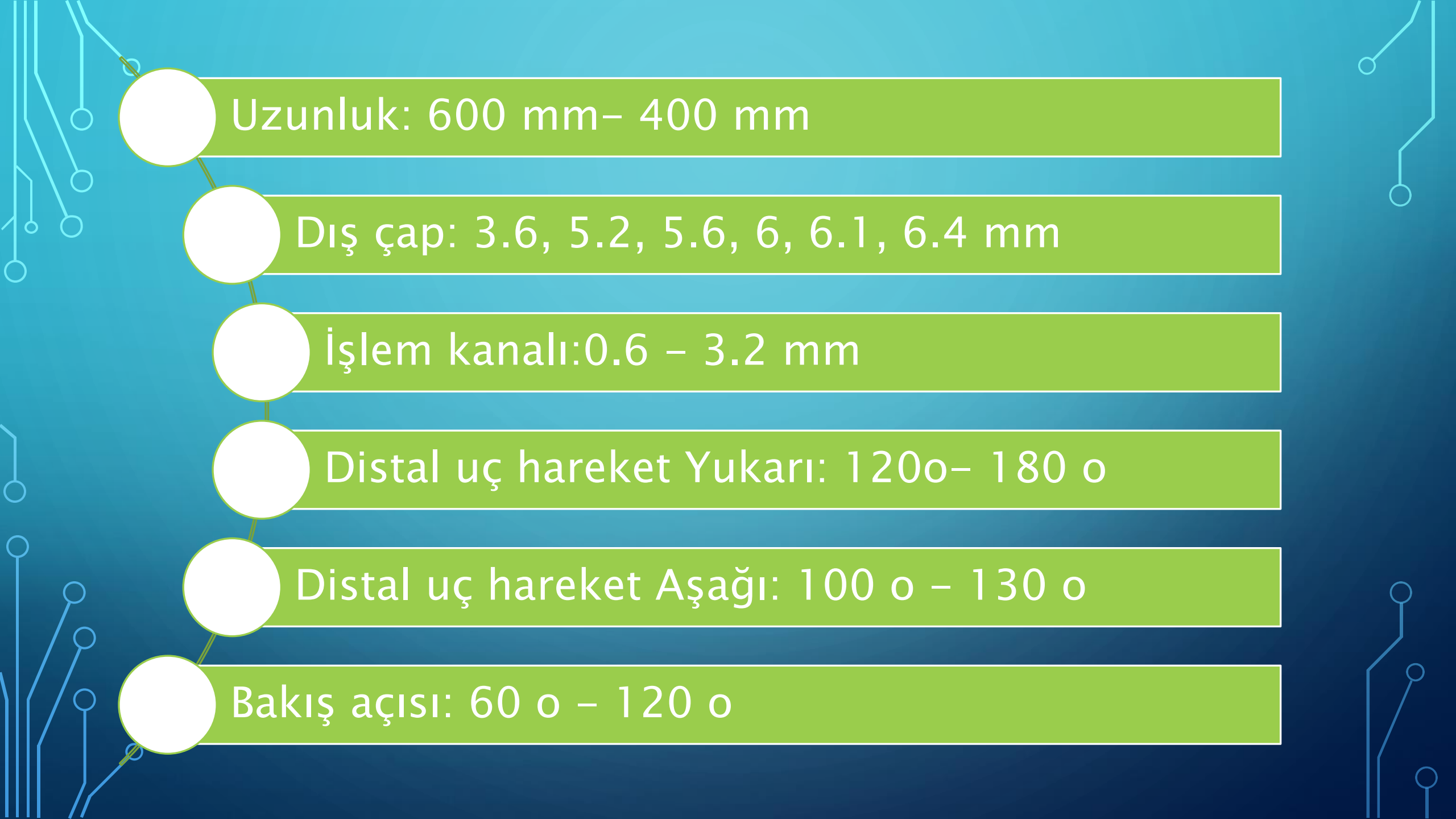
- Periferik hava yolları değerlendirebilir
- ET, trakeostomi kanülü, rijit bronkoskop içinden rahat geçebilir

Sedasyon

- Genel anestezi gerekmez
- Sedasyonsuz bile yapılabilir
- Lokal anestezi ile uygulanabilir

Uygulama

- Yatak başında hastaya uygulanabilir
- Öğrenimi daha kolay
- Daha az sayıda personel gereksinimi



Uzunluk: 600 mm– 400 mm

Dış çap: 3.6, 5.2, 5.6, 6, 6.1, 6.4 mm

İşlem kanalı: 0.6 – 3.2 mm

Distal uç hareket Yukarı: 120°– 180 °

Distal uç hareket Aşağı: 100 ° – 130 °

Bakış açısı: 60 ° – 120 °



ENDİKASYONLAR



Tanısal



Terapotik



Havayolu yönetimi

- **Direkt görme:**

- Anatomik yapılar; *USY, trakea, bronş, subsegmental bronş*

- Yapısal; *mukoza, lümen çap*

- Dinamik; *glottis malazı, pulsasyon*

- İçerik; *mukus plak, kan, sekresyon*

- **BAL** : *mikrobiyoloji, sitoloji, lipid-hemosiderin Y. Makr*

- **Fırçalama**

- **Biyopsi.**

Plevral sıvı

Öksürük

Hemoptizi

Stridor ve ronküs

Havayolu obstrüksiyonu şüphesi

Anormal radyolojik bulgu varlığı

Diffüz İnterstisyel Akciğer Hastalıkları

Bronş kanseri

Metastatik kanserler

Persistan atelektazi

Ses kısıklığı – vokal kord paralizisi

Trakeoözefageal fistül kuşkusu

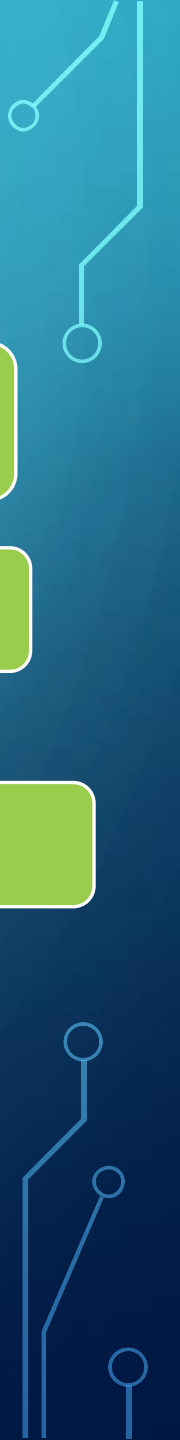
Toksik duman ve gaz inhalasyonu

Pulmoner infeksiyonlar

Toraks travması

Trakeal Stenoz

Persistan pnömotoraks



Terapotik Endikasyonlar

- Aspire yabancı cisimler çıkartmak
- Zor entübasyonları yapmak
- Endobronşiyal tedaviler
- Mukus sekresyonlarının-plaklarının
- Temizlenmesi
- Terapatik BAL

Havayolu obstrüksiyonu şüphesi

- Havayolunda darlığın gösterilmesi
- Darlığın nedeninin araştırılması
- Aspirasyon öyküsü, kuşkusu
 - ✓ Lokalize ronküs varlığı
 - ✓ Akım volüm eğrisinde anormallik
 - ✓ Radyolojik olarak fokal parlaklık artımı, hava hapsi bulgusu

Hemoptizi tedavisi

- Tekrarlayan bronkoskopik aspirasyon (suctioning)
- Buzlu su ile irrigasyon
- Topikal vazomotor ajanların instilasyonu
- Bronkoskopik tamponad
- Balon tamponad
- Gelfoam, fibrin glue ile tamponad

Solunum yetmezliği

- Entübasyon tüpünün yerleştirilmesi
 - ✓ Zor entübasyon
- Entübasyon tüpünün yerinin pozisyonunun değerlendirilmesi
- Entübasyon tüpü değişimi

Bronkoskopik drenaj

- Mediastinal kistler
- Bronkojenik kistler
- Akciğer abseleri

Kritik bakımda bronkoskopi

- Entübasyon tüpü yerleştirme
 - değiştirme (zor entübasyon)
- Entübasyon tüpünün pozisyonunun konfirme edilmesi
(trakeal entübasyon?)
- Kimyasal – termal yaralanma
- Bronkoplevral fistülün lokalizasyonu – tedavisi
- Ekstübasyonda üst hava yollarının değerlendirilmesi

- 
- ❖ Ventilatör ilişkili pnömonide alt solunum yollarından nitelikli örnek alınması
 - ❖ Trakeotomi sonrası hava yollarının temizlenmesi-değerlendirilmesi
 - ❖ Sekresyon aspirasyonu
 - ❖ Tıkaç temizliği
 - ❖ Weaning zorluğu sebebi araştırma
 - ❖ Rezorbe olmayan pnömoniler

Acilde Bronkoskopi Kullanımı

Havayolu yönetimi

- ✓ Nasotrakeal entübasyon
- ✓ Orotrakeal entübasyon
- ✓ Trakeal yaralanmalarda entübasyon
- ✓ Trakeoözofagial fistüllerde entübasyon
- ✓ Tek ana bronş entübasyonu
- ✓ Entübasyon tüpü doğrulama



Acilde tedaviye yönelik

- ✓ ET değişimi
- ✓ Trakeal kanama
- ✓ Havayolunda yabancı cisim
- ✓ Trakeal ağaçta mukus tıkaçı
- ✓ Akciğer atelektazisi
- ✓ Duman inhalasyonu

Beraber kullanım

- ✓ ET ve trekostomi içinden girişim
- ✓ Perkutan trekeostomi açılması
- ✓ Solunum maskesi içinden kullanım
- ✓ ET sırasında sedasyon kullanım zorluğu
- ✓ Pozisyon verilemeyen hastada Nazotrakeal ET
- ✓ Obezitede Orotrakeal ve nazotrakeal ET

Acilde Kullanımın Sıkıntılı Olduğu Durumlar

- ✓ Deneyimsiz kullanıcı
- ✓ Ağız içi ve burunda kanama
- ✓ Kooperasyon sorunu
- ✓ Personel ve ekipman yetersizliği
- ✓ Lokal anestezi KE leri
- ✓ Kanama diatezi problemleri



Mutlak kontrendikasyonlar

- ✓ Hastanın veya yakınının işleminin yapılmasını kabul etmemesi
- ✓ Bronskopiyi yapacak personelin deneyimsiz oluşu
- ✓ İşlemin yapıldığı laboratuarda oksijen desteğinin sağlanamaması
- ✓ Acil müdahale için gerekli ekipman-ilaçların bulunmaması



Bronskopi uygulaması için riskin çok arttığı durumlar

- ❑ Malign aritmi
- ❑ Derin refraktör hipoksi
- ❑ Ciddi kanama diyatezi



Bronskopide komplikasyon riskinin arttığı durumlar

- Hastanın kooperasyonunun düşük olması
- Yakın zamanda geçirilmiş MI veya unstabil angina
- Unstabil astım
- İmmünosupresyon
- Unstabil kardiyak aritmiler
- Debilite, ileri yaş, malnütrisyon

- Üremi ve pulmoner hipertansiyon
- Trakeal obstrüksiyon
- Mekanik ventilasyon gerektiren solunum yetmezliği
- Derin hipoksi veya herhangi bir derece hiperkapni
- VCSS



Bronkoskopide komplikasyon riskini arttıran durumlar (Kontrendikasyonlar)

- Hastanın koopere olamaması*
- Deneyimi yetersiz bronkoskopist*
- Gerekli ekipman ve olanakların yetersiz olması*
- Stabil olmayan anjina pektoris*

*** Mutlak kontrendikasyonlar**

- 
- ❖ **Oksijen tedavisine yanıtızsız refrakter hipoksemi***
 - ❖ **KontROLSÜZ aritmi***
 - ❖ Şiddetli – semptomatik hiperkapni
 - ❖ Ağır büllöz amfizem
 - ❖ Ağır astım
 - ❖ Ciddi koagülopati
 - ❖ Anlamlı üst hava yolu obstrüksiyonu

*** Mutlak kontrendikasyonlar**

- 
- ❖ Stabil olmayan servikal omurga
 - ❖ Mekanik ventilasyon gereksinimi olan solunum yetmezliği
 - ❖ Yüksek PEEP uygulanmakta olan hasta
 - ❖ Ağır sistemik hastalık
 - ❖ Laser, elektrokoter, argon plazma koagulatör kullanımı



Kanama riskini arttıran durumlar

- Fırçalama, biyopsi veya iğne aspirasyonu yapılacaksa;
 - anti-platelet ajan kullanımı
(örneğin; aspirin, klopidoğrel)
 - antikoagulan tedavi (kumadin)
 - trombositopeni
 - koagülopati
- BUN – kreatinin yüksekliği



Son 6 hafta içinde, aşağıdaki kriterlerden herhangi birine sahip olan olgularda, acil olmayan bronkoskopilerin ertelenmesi önerilir

- Myokardiyal iskemi (anstable anjina, MI)
- Dekompanze kalp yetmezliği
- Astım – KOAH alevlenmesi
- Yaşamı tehdit eden kardiyak aritmiler

Rölativ Kontrendikasyonları

- Kanama problemleri
- Ağır Solunum Yolu Obstrüksiyonları
- Ağır hipoksi
- Disritmi, pulmoner hipertansiyon



CASE REPORT

Prehospital fiberoptic intubation☆☆☆

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KEYWORDS

Airway management;
Tracheal intubation;
Prehospital
emergency care;
Bronchoscope

Summary We present a case of a patient with severe multiple trauma who was treated at the scene by a physician-staffed trauma life support team. Due to a complete tracheal transection, a "cannot ventilate, cannot intubate"-situation occurred. The patient was then intubated using a fiberoptic bronchoscope in the prehospital setting. The current literature concerning fiberoptic intubation in emergencies is discussed.
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Introduction

Airway management remains a crucial issue in prehospital emergency care and has been discussed consistently in the scientific literature, especially in recent years. Establishing an airway under prehospital emergency conditions is more difficult than in the standard hospital clinical situation, where expert help and alternative airway devices are usually abundantly available.¹ Various success rates and outcomes concerning rapid sequence induction and tracheal intubation in the prehospital setting have been reported, and the deleterious effects of unrecognised oesophageal and endobronchial out-of-hospital intubation have been highlighted

recently.^{2,3} We report a case where prehospital airway management proved to be extremely complicated and control of the airway was finally achieved using fiberoptic bronchoscopy.

Case report

The rescue helicopter was dispatched to a motor-vehicle accident and was the first physician-staffed vehicle to arrive on the scene. The crew found three patients injured after a severe crash between a truck and a passenger car, whose driver had to be extracted from the wreckage by fire-fighters and was treated by the helicopter crew.

At the first assessment, the 70-year-old male was unconscious with a Glasgow Coma Score of 3 and skin cyanosis. Although the patient was breathing spontaneously, bubbling and snoring indicated partial airway obstruction. The pulse rate of 120 per minute was palpable at the carotid arteries only. In addition to abrasions across the abdomen and signs of fracture of the left femur, physical examination revealed severe craniofacial trauma and bruises and marks across the chest wall. Subcutaneous emphysema and crepitation on the left side of the chest and around the neck indicated the presence of severe thoracic trauma.

[†] A Spanish translated version of the summary of this article appears as Appendix in the final online version at 10.1016/j.resuscitation.2007.08.013.

^{††} This case report has in part been presented as a poster at the 1st Joint Congress of the European Association for Trauma and Emergency Surgery (EATES) and the European Trauma Society (ETS), Graz, Austria, 23–26 May.

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Figure 1 Insertion of the endotracheal tube via bronchoscopy at the accident scene.

Pentax-AWS airway Scope as an alternative for awake flexible fiberoptic intubation of a morbidly obese patient in the semi-sitting position

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Abstract

For anesthesia induction in a morbidly obese patient with a full stomach, awake flexible fiberoptic bronchoscope (FOB) intubation in the semi-sitting position may be a suitable choice. A new rigid indirect videolaryngoscope, the Pentax-AWS system, has a unique feature of an adjustable built-in monitor

patients [1]. The Pentax-AWS airway Scope system (AWS; Hoya, Tokyo, Japan) is a new rigid indirect videolaryngoscope with integrated tube guidance; it has an adjustable built-in monitor with which the practitioner can orient, allowing ease of the intubation maneuver [2].

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Original contribution

Use of the Laryngeal Mask Airway-Aintree Intubating Catheter-fiberoptic bronchoscope technique for difficult intubation[☆]

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Keywords:

Aintree Intubation Catheter;
Airway;
Fiberoptic intubation;
Laryngeal Mask Airway;
Laryngoscopy

Abstract

Study Objective: To determine whether intubation using an Aintree Intubation Catheter (AIC), fiberoptic intubation (FOB), and Laryngeal Mask Airway (LMA) is safe and effective for securing the airway in patients who are difficult to intubate after induction of general anesthesia.

Design: Retrospective review of departmental difficult airway database procedures completed between July 2006 and December 2009.

Setting: Academic medical center.

Measurements and Main Results: During the study period, 128 of 500 patients entered into the difficult airway database underwent the LMA-AIC-FOB technique for intubation. One hundred nineteen (93%) of the 128 patients were successfully intubated by the LMA-AIC-FOB technique, and 9 required an alternate technique. No patient who underwent the LMA-AIC-FOB technique experienced an airway-related mortality or required an emergency surgical airway procedure.

Conclusion: The LMA-AIC-FOB technique is safe and effective for patients who are difficult to intubate after induction of anesthesia.

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source to provide illumination, and lenses at the tip of the scope and eyepiece provide an image that can be focused by the user. In brief, the fiberoptic bronchoscope consists of an eyepiece atop a control handle with a focusing ring that is attached to a thin flexible fiberscope. A thumb control lever allows the distal tip of the scope to be flexed or extended. A separate port that travels the distance of the scope can be utilized for suction, injection of saline or local anesthetic, oxygen insufflation, or passage of brushes or forceps for diagnostic purposes.

A more recent evolution to the bronchoscope is the addition of a charge-coupled device camera, whereby a captured digital image is then transmitted electronically to an external monitor screen. More recent hybrid technology retains fiberoptic bundles from the distal end of the scope to the handle, where the charge-coupled device camera is located. This configuration allows smaller external diameters of bronchoscopes with larger working channels and enhanced flexibility.

The components of the flexible fiberoptic bronchoscope have been detailed well in prior reviews. Figures 1 and 2 highlight basic components of a flexible bronchoscope. We refer the reader to one such comprehensive book chapter to explore these components in more detail.⁸ Rigid or semirigid fiberscopes such as the Bonfils and UpsherScope have also been described in successful management of the difficult airway^{9,10} but are not discussed in this review.

Indications

Fiberoptic bronchoscopes are currently used to facilitate endotracheal intubation via either the nasal or oral route, in the positioning of endotracheal and endobronchial tubes and bronchial blocking devices, and in airway examination



Fig. 2. Additional components of a flexible bronchoscope.

or evaluation. In clinical scenarios in which tracheal intubation is deemed necessary and mask or supraglottic ventilation (eg, via a laryngeal mask airway [LMA]) is unlikely to be successful or poses an aspiration risk, awake FOI is a standard approach. FOI remains the accepted standard in elective airway management of the awake spontaneously breathing patient with an anticipated difficult airway.¹¹ FOI is ideally suited in such patients because intubation can be performed prior to the induction of general anesthesia with its attendant risks of inadequate ventilation and oxygenation, loss of upper airway patency, and failed intubation. This FOI technique also safeguards against the risk of the cannot intubate/cannot ventilate scenario. Success of the technique, however, presupposes adequate time for preparation in a cooperative patient, a requirement for safe and successful FOI.

Table 1 lists common indications for awake FOI. The need for FOI may be anticipated based on a history of difficult intubation and various anatomic and anthropometric features that may predict difficult laryngoscopy. These include limited mouth opening, limited thyromental distance, reduced neck mobility, inability to prognath, oropharyngeal classification, and obesity.¹² FOI may also be indicated for known or suspected cervical spine instability, anatomic malformations of the mandible or larynx, con-

- 2011 tarihli uyanık fiberoptik entübasyon isimli derlemede fiberoptik entübasyon için gold standart terimi kullanılmış.

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Fiberoptische Wachintubation

Zusammenfassung

Das Atemwegsmanagement gehört zur Kernkompetenz der Anästhesiologie. Defizite in Ausbildung, Ausstattung oder Training, aber auch schicksalhafte Komplikationen in diesem Bereich sind für einen signifikanten Teil der anästhesiologisch verursachten Morbidität und Letalität verantwortlich. Mittlerweile befindet sich eine Vielzahl technischer Hilfsmittel auf dem Markt, mit deren Hilfe der „schwierige Atemweg“ gemeistert werden soll. Nichtsdestotrotz kommt es nach wie vor zu Situationen, in denen die Beatmung eines anästhesierten Patienten weder mithilfe der endotrachealen Intubation noch mithilfe anderer Hilfsmittel gelingt. Ein solches Desaster ist häufig mit katastrophalen Folgen für den Patienten – dauerhaftes neurologisches Defizit oder Tod – verbunden. Die fiberoptische Wachintubation hat deshalb weiterhin als „Goldstandard“ beim bekannt schwierigen Atemweg zu gelten, weil sie – richtig angewendet – die Situation vermeidet, dass ein Patient infolge ärztlicher Maßnahmen ateminsuffizient wird, bevor ein Endotrachealtubus sicher platziert werden konnte.

Schlüsselwörter

Atemwegsmanagement · Fiberoptiktechnologie · Intubation · Algorithmen · Lokalanästhetika

Awake fiberoptic intubation

Abstract

Airway management is a core task for anesthesiologists. Deficiencies in training or equipment as well as fateful complications in this field are responsible for a significant proportion of anesthesia-associated morbidity and mortality. Nowadays there are a variety of advanced technical aids on the market to overcome the difficult airway. Nevertheless, the “cannot intubate cannot ventilate scenario” still occurs and regularly results in poor outcome, such as permanent neurological deficits or even death. Therefore, awake fiberoptic intubation remains the gold standard in the expected difficult airway because when applied correctly this technique never leads to a point where a patient's respiration is compromised as a result of medical measures before a secure airway has been established.

Keywords

Airway management · Fiber optic technology · Intubation · Algorithms · Anesthetics, local

BRONKOSKOPI İŞLEMİ

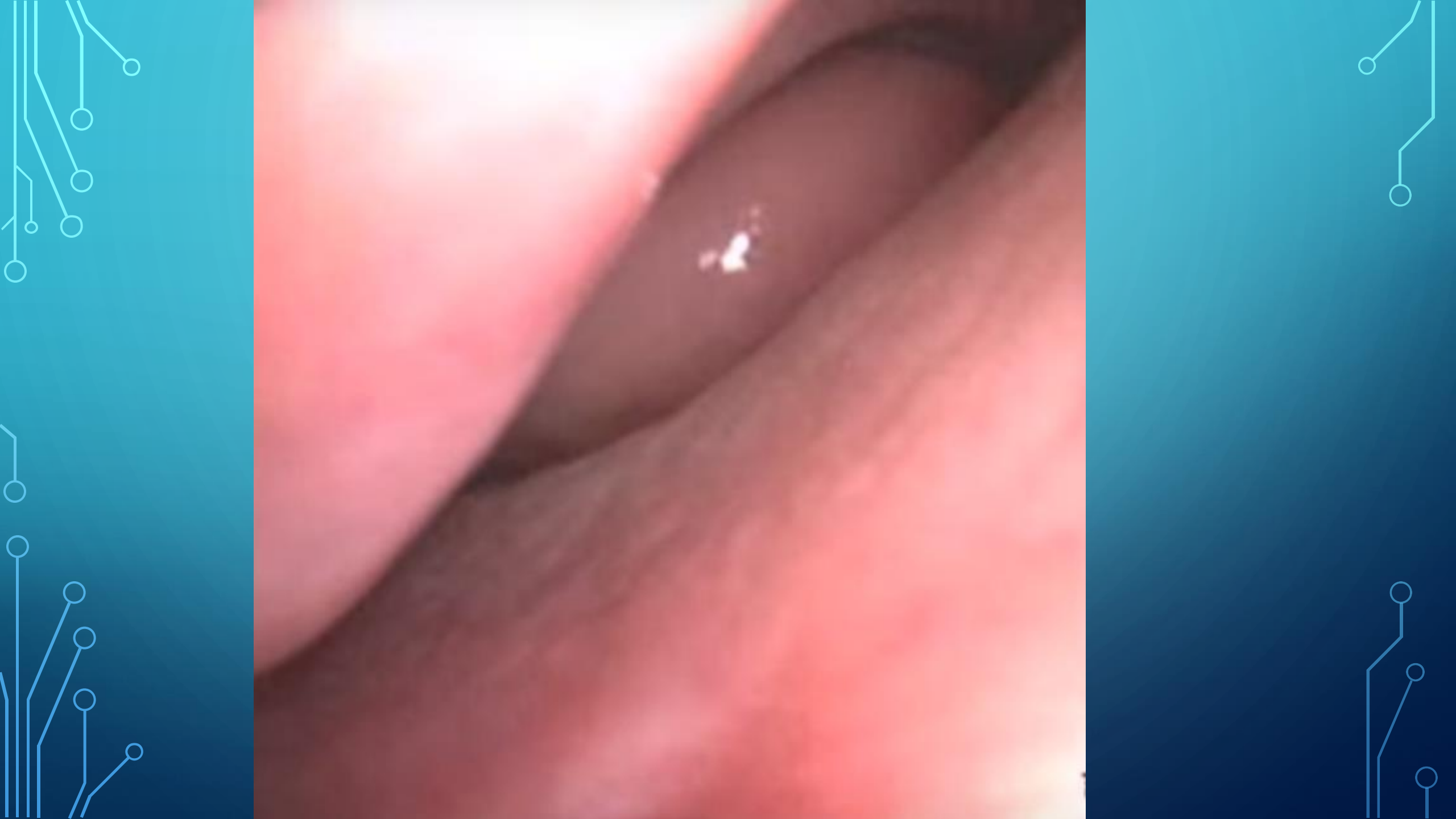


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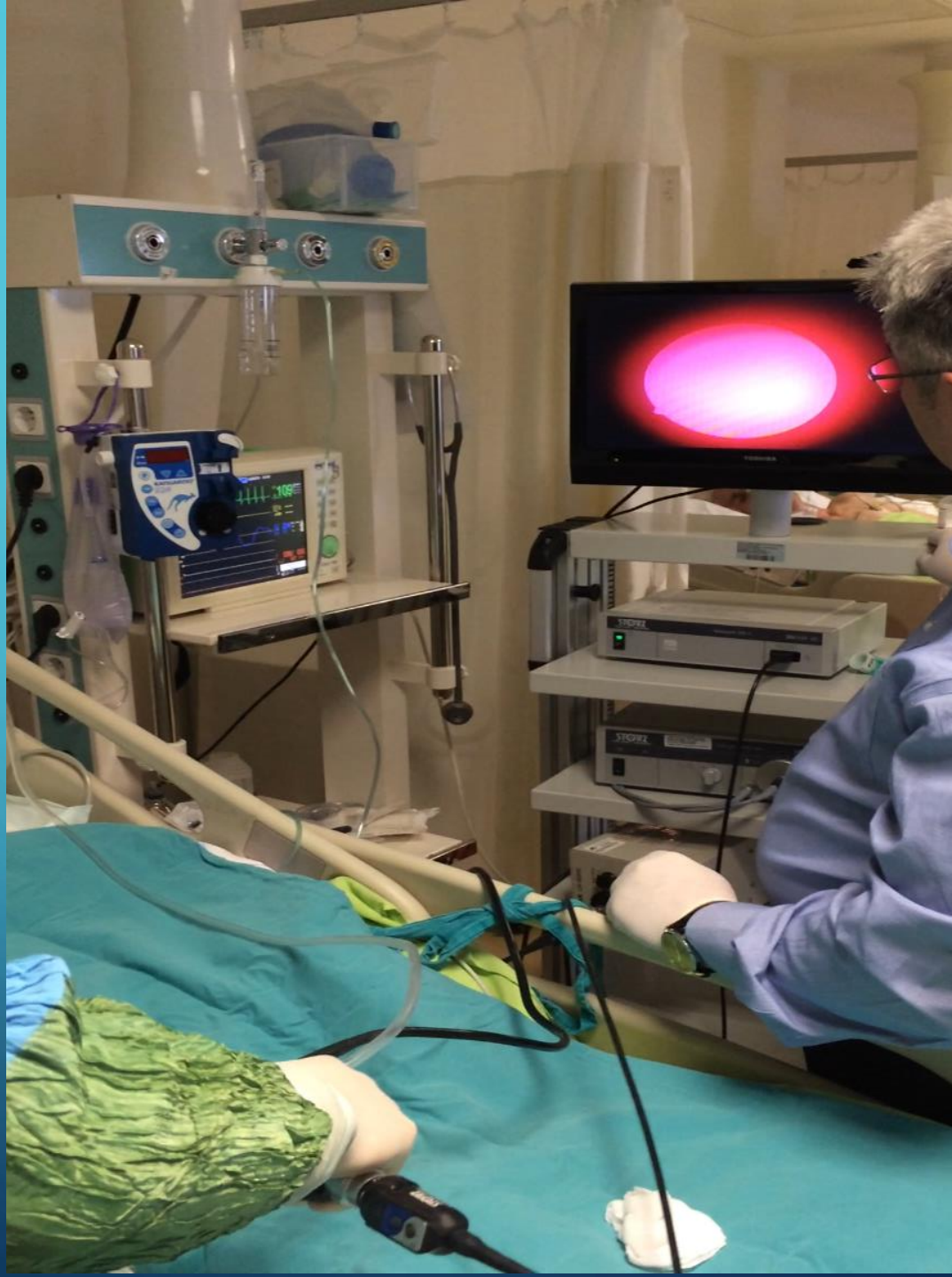


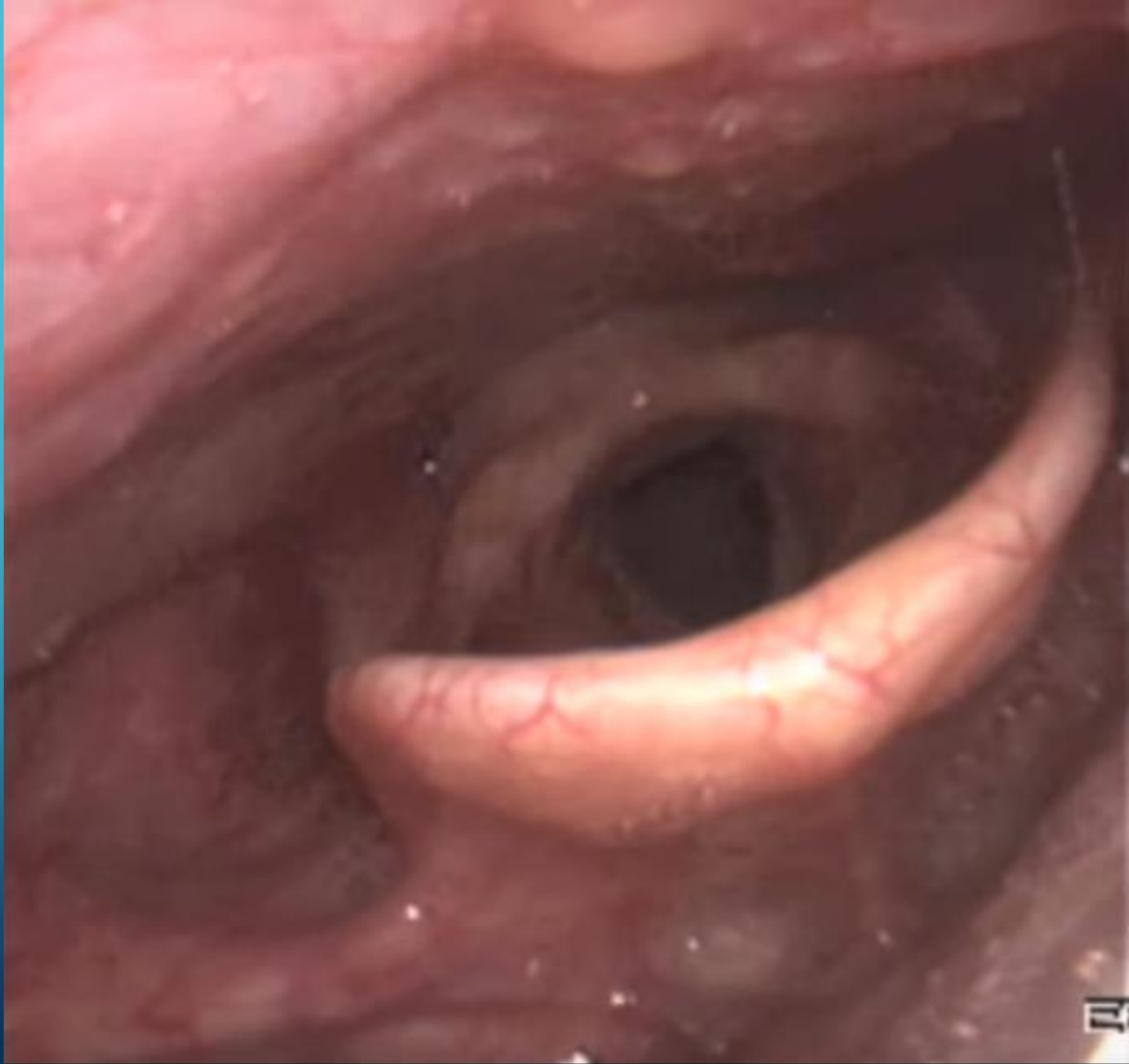














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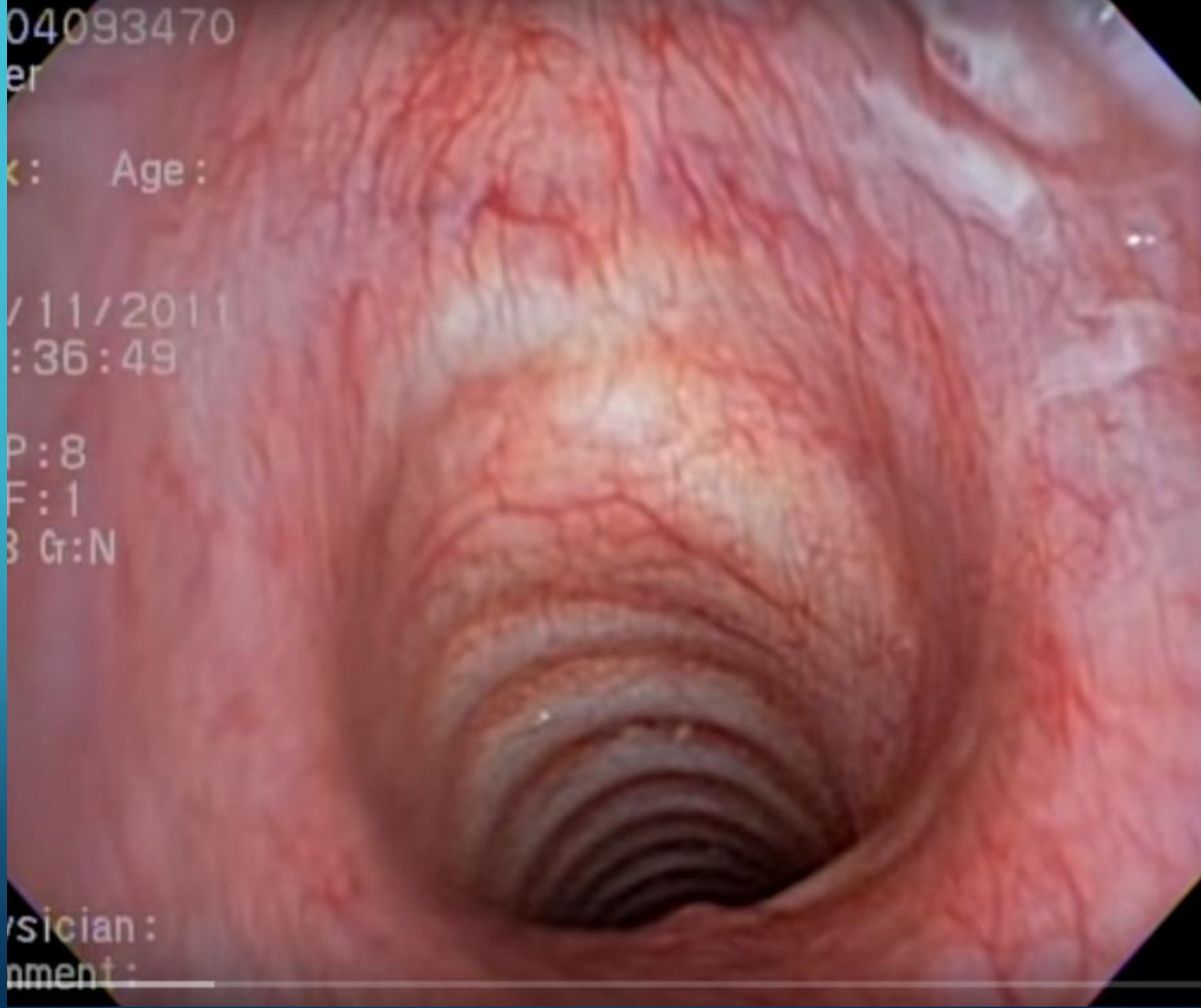
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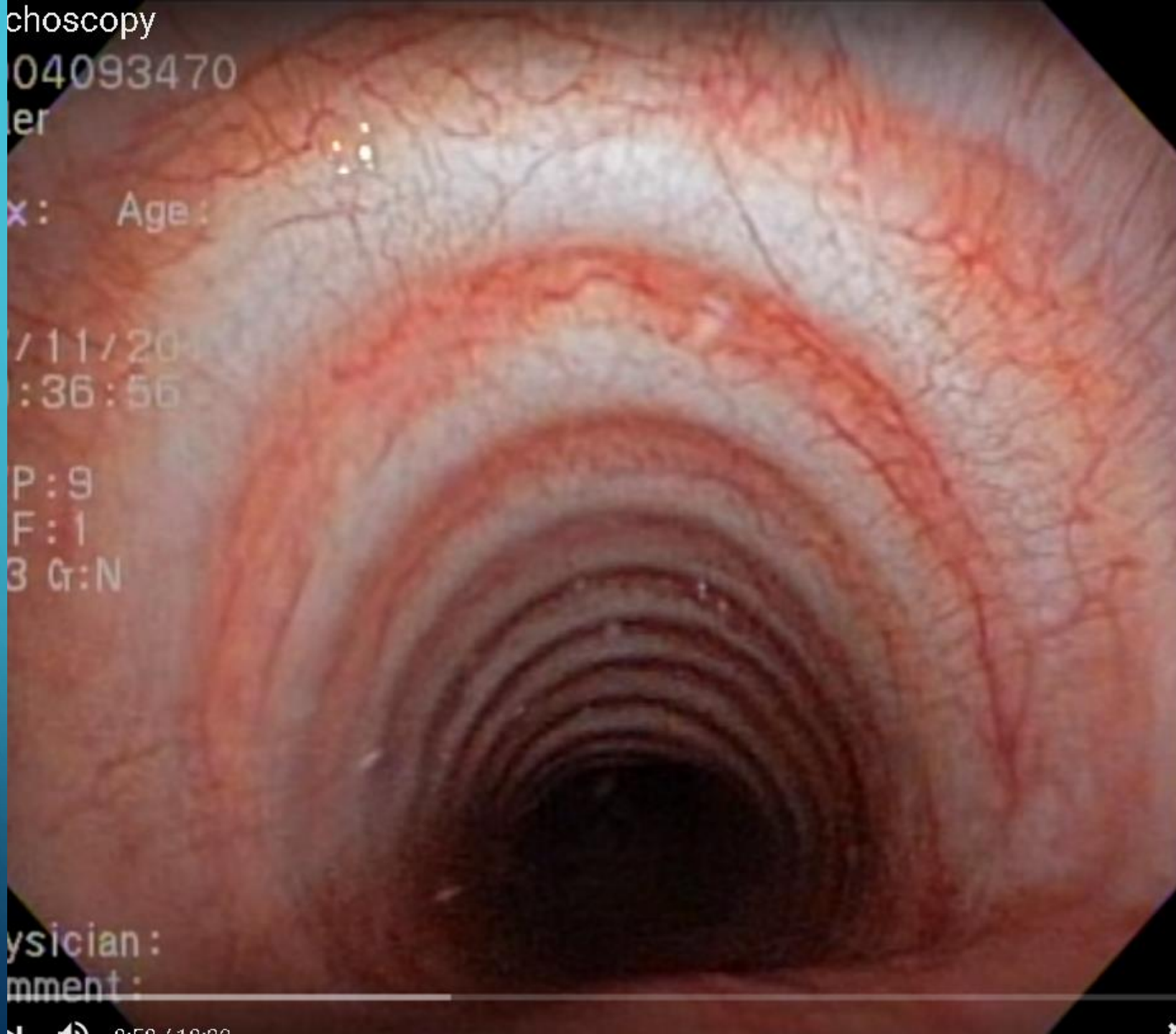
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choscopy

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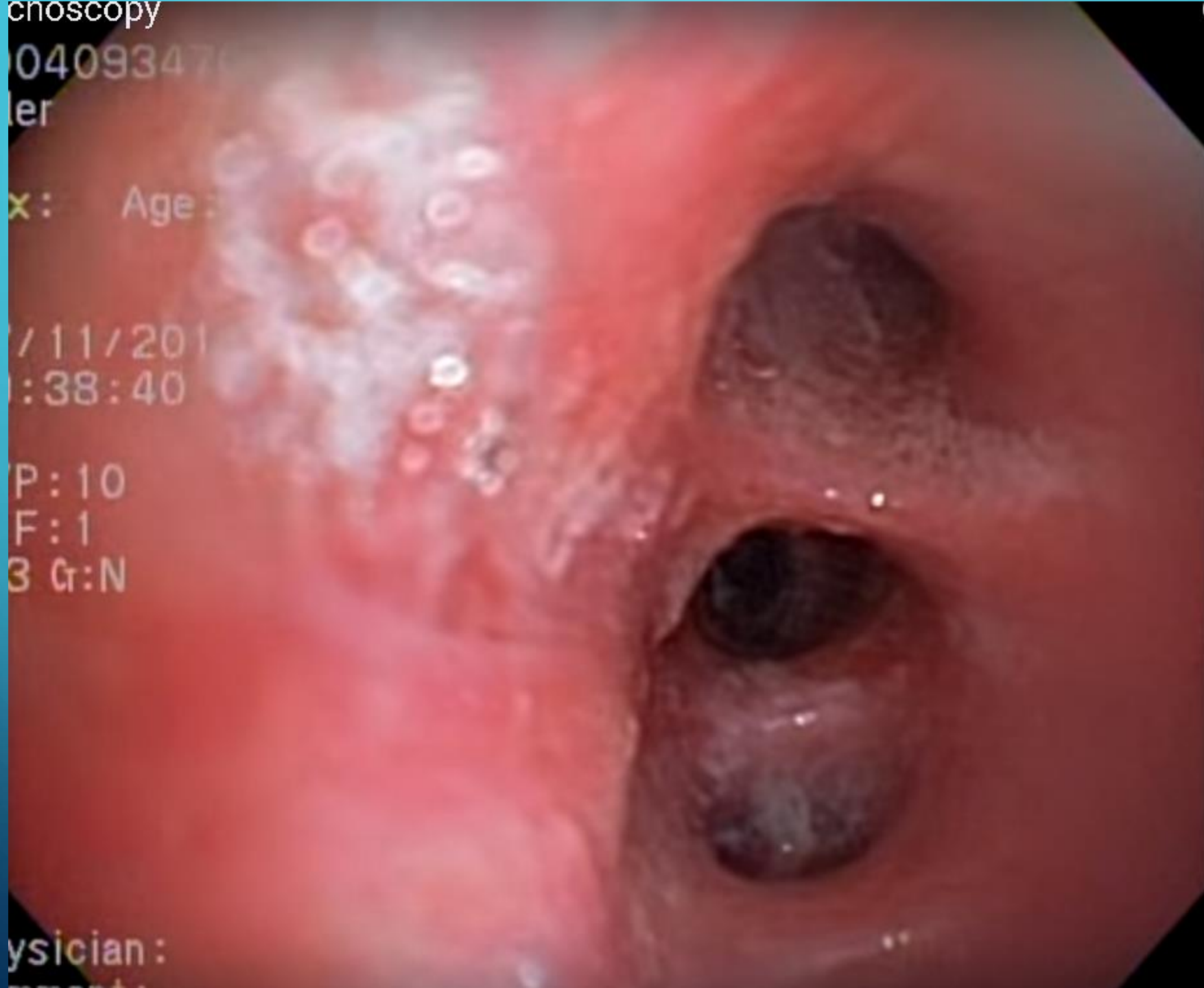
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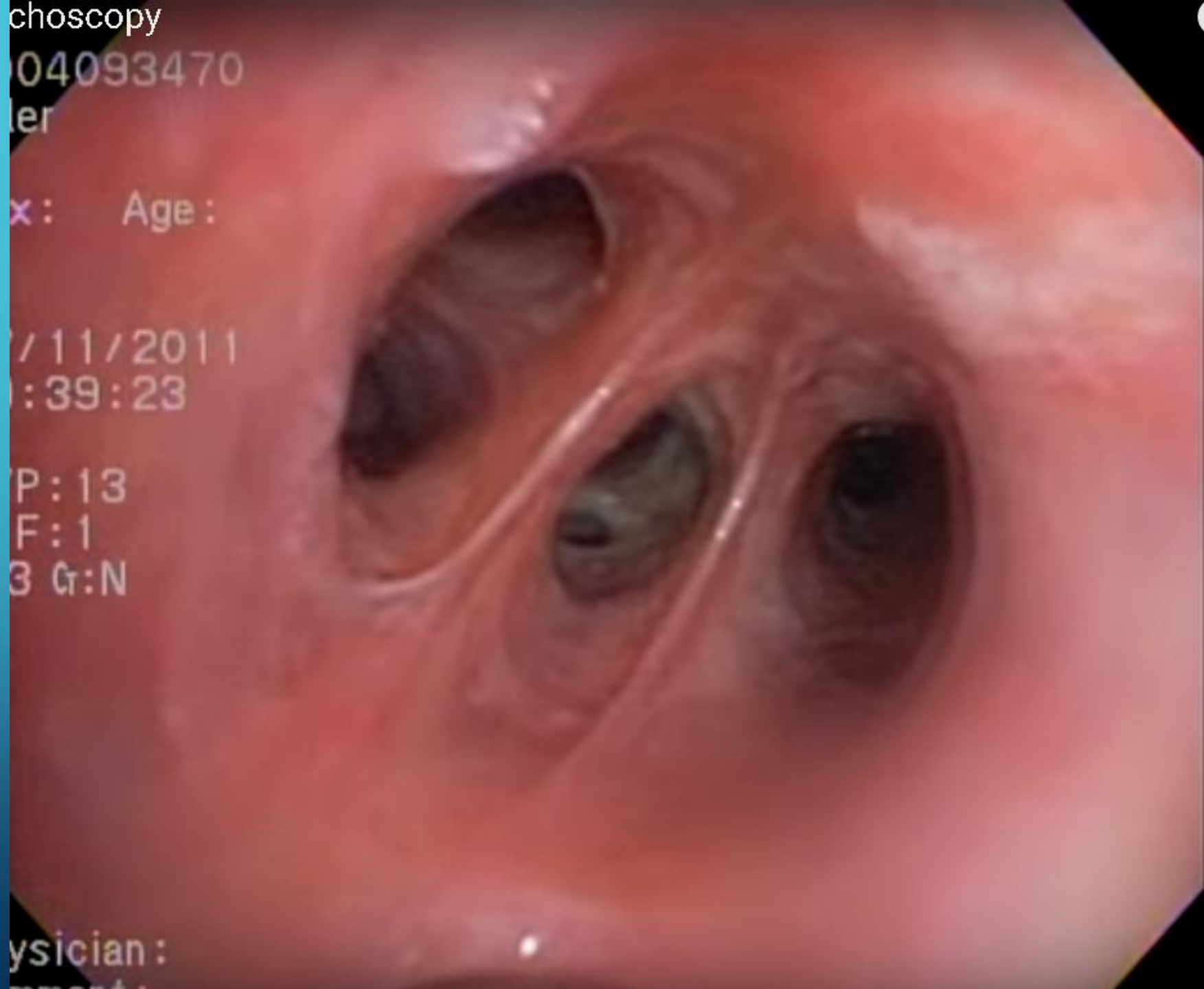
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choscopy

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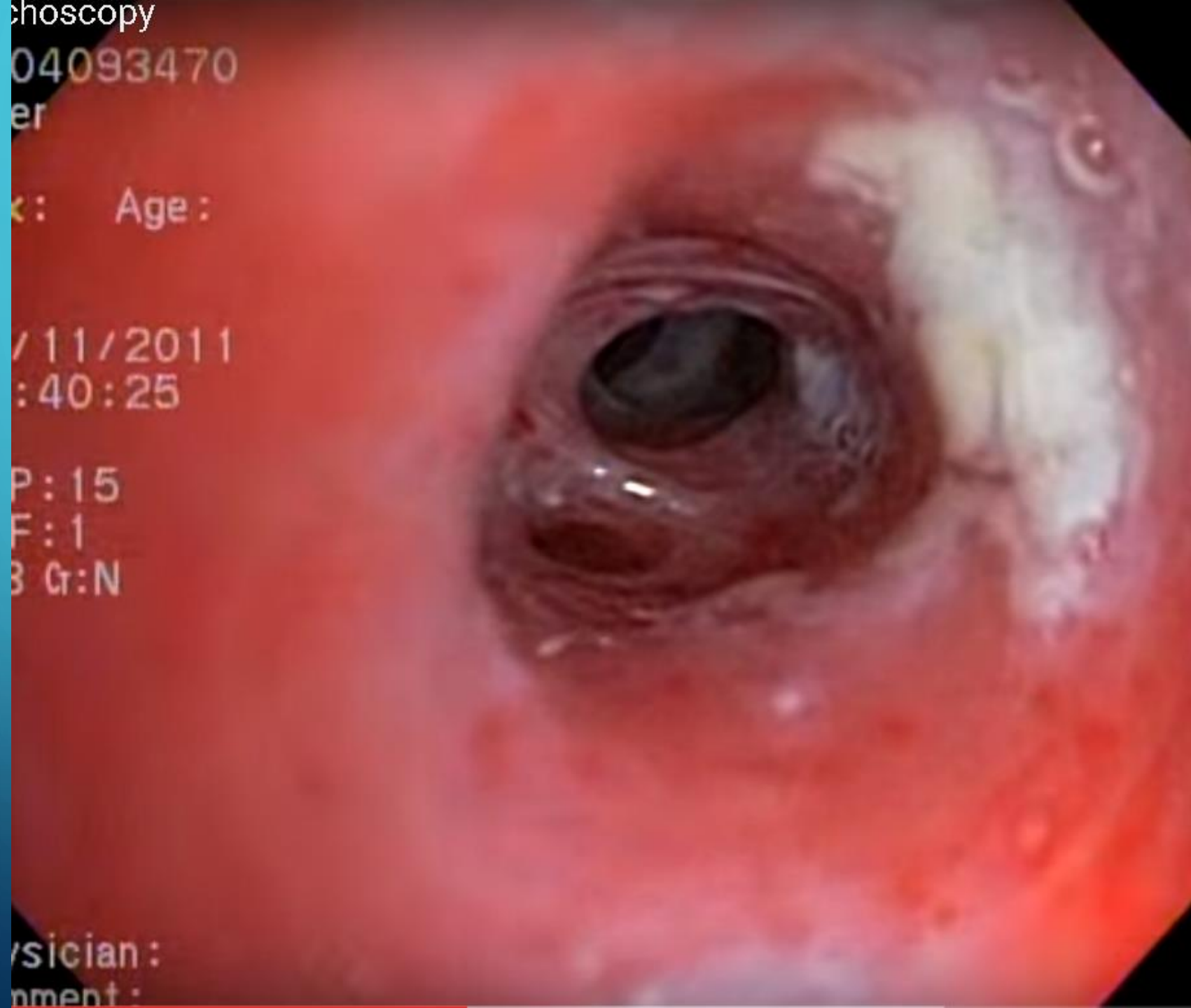
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choscopy

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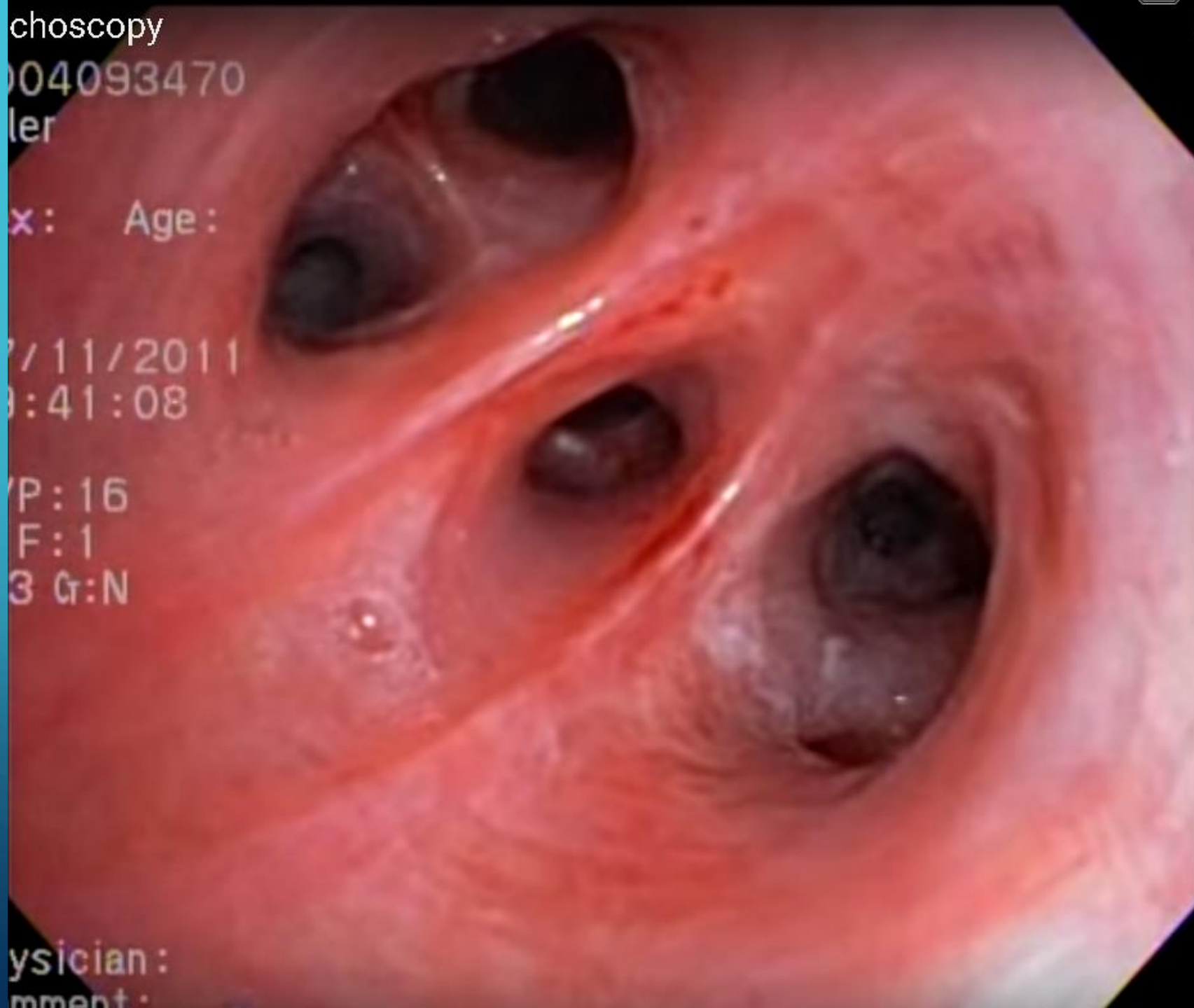
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choscopy

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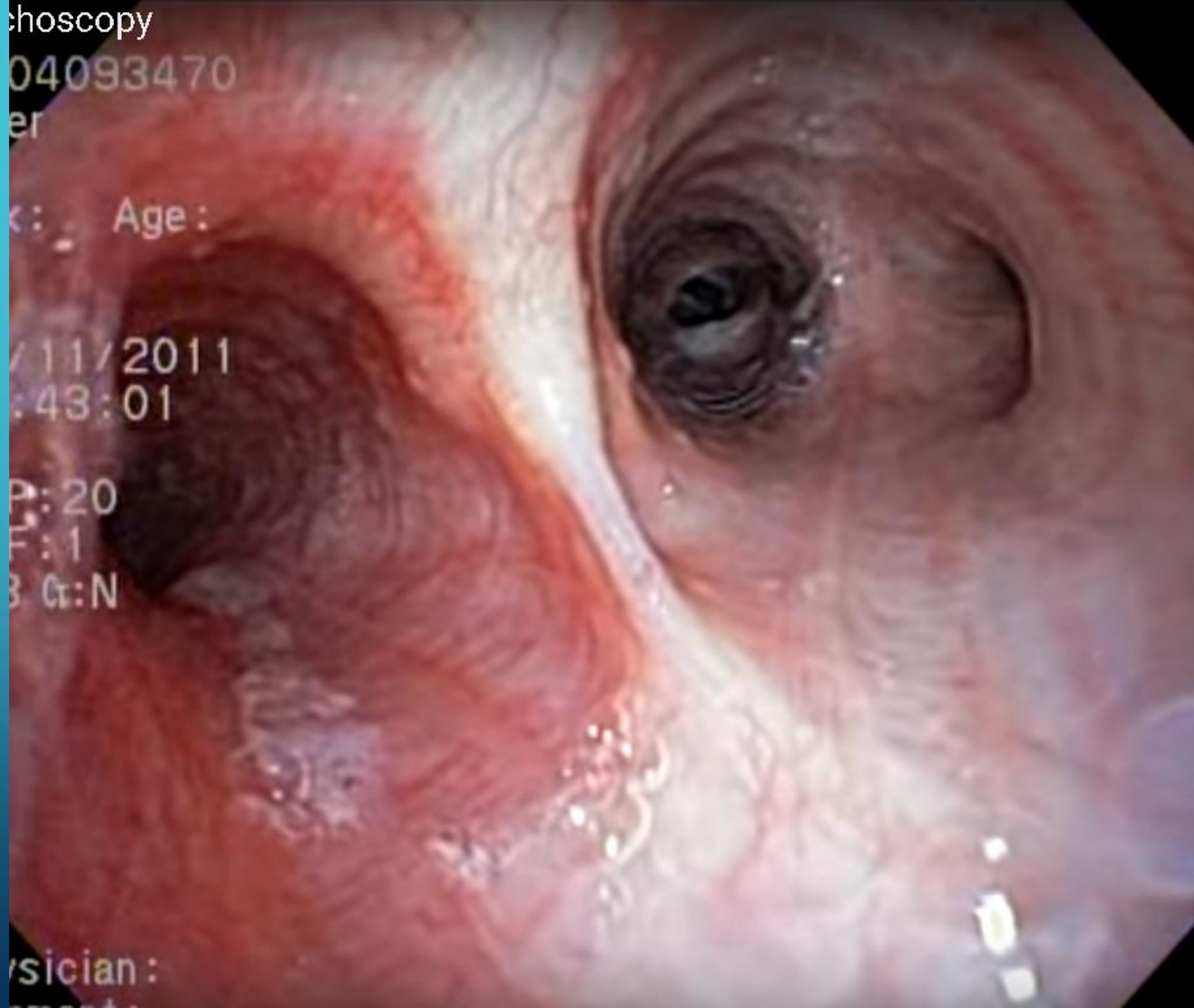
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Tam ekran







