IPOPORTO

Serviço de Otorrinolaringologia e Cirurgia Cérvico-Facial

INFECTIOUS COMPLICATIONS IN HEAD AND NECK SURGERY:
PORTO ONCOLOGY CENTER RETROSPECTIVE ANALYSIS

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1 - INTRODUCTION

Why study this theme?

- Head and neck cancer (HNC) is the 6th most common type of cancer, accounting for an estimated number of 650,000 new cancer cases and 350,000 cancer deaths worldwide every year (Jemal A et al. 2011)
- Incidence of oropharyngeal cancer in the youngest population has been increasing (Marur S et al. 2008)
- **Surgery is the preferred treatment for HNC** (Andry G et al. 2005)

We should know and be prepared to deal with any kind of complication, especially the **potentially curable ones**, such as the **infectious complications**

Are we paying attention to post-operative complications?

Despite the best preoperative care, surgical technique and careful postoperative management, complications frequently occur in HNC patients

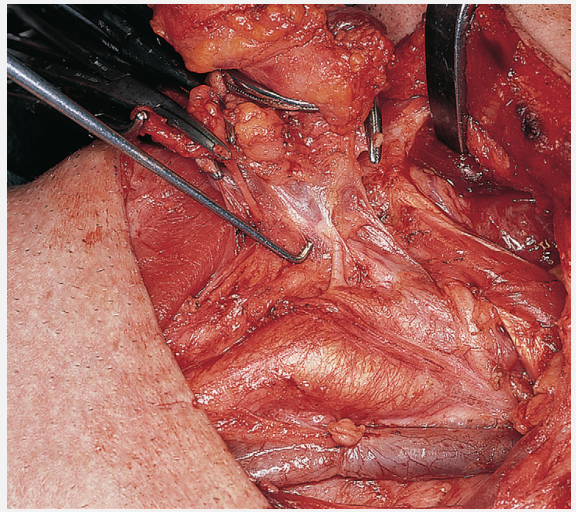
- Surgical site infection has been the most frequent and significant complication (Cunha TF et al. 2012; Park SH et al. 2011)
- The development of a surgical site infection can cause prolonged hospital stays, increased health care costs, and delayed access to post-operative adjuvant therapy (Cunha TF et al. 2012; Park SH et al. 2011)

2 - OBJECTIVES

With this study we aimed to:

- **analyze the impact of infectious status and the microbiology in major neck surgeries post-op period**

- identify the most common complication after surgery
- identify the most common microorganisms
- identify the most common comorbidities
- analyze the impact of these complications in the hospitalization length
- identify possible predictive risk factors to prolong hospitalization length



In JATIN SHAH'S HEAD AND NECK SURGERY AND ONCOLOGY (2012)

3 – MATERIAL & METHODS

- ✓ Retrospective analysis of medical records
- ✓ 44 months - October 2012 to May 2016
- ✓ Oncologic patients submmited to **inaugural *major* neck surgeries**

- ✓ **Studied Variables:**
  - Tumor location
  - TNM staging
  - Type of complication
  - Isolated microbiological agent
  - Pre and post-operative hemoglobin and albumin levels
  - American Society of Anesthesiologists (ASA) stage
  - Prior radio and / or chemotherapy
  - Body Mass Index (BMI)
  - Alcohol and tobacco use
  - Medical comorbidities
  - Hospitalization length
  - Mortality

Statistical Analysis with **SPSS®** v.22
***P* values of <.05** were statistically significant

Exclusion Criteria:
- No data on medical record
- Nose cancer with neck procedures
- Re-intervention surgery

4 – RESULTS & DISCUSSION

Sample Characterization

44 months – 761 major neck surgeries performed **– 96 surgeries had complications (12,6%)**

Sample Size (n) = 96	
Gender	
Male (n)	**91**
Female (n)	5
Age (mean+/- s.d.)	**57** +/- 9,4
Min	37
Max	81
Tumor Location	
Hypopharynx % - (n)	**45,8% – (44)**
Larynx % - (n)	**27,1% - (26)**
Oropharynx % - (n)	11,5% - (11)
Tongue % - (n)	10,4% - (10)
Oral Cavity % - (n)	5,2% – (5)
Mortality % - (n)	**12,5%** - (12)

TNM stage		
T		
	1 - % - (n)	1% - (1)
	2 - % - (n)	10,4% - (10)
	3 - % - (n)	38,5% - (37)
	4 - % - (n)	**50% - (48)**
N		
	0 - % - (n)	29,2% - (28)
	1 - % - (n)	18,8% - (18)
	2 - % - (n)	**49% - (47)**
	3 - % - (n)	3,1% - (3)
M		
	0 - % - (n)	**97,9% - (94)**
	1 - % - (n)	2,1% - (2)

ASA stage	
I - % - (n)	13,5% - (13)
II - % - (n)	**43,8%** - (42)
III - % - (n)	**41,7%** - (40)
IV - % - (n)	1% - (1)

Primary Surgery	**81%**
Pre RT	**18,8%**
Pre Chemo	**16,7%**

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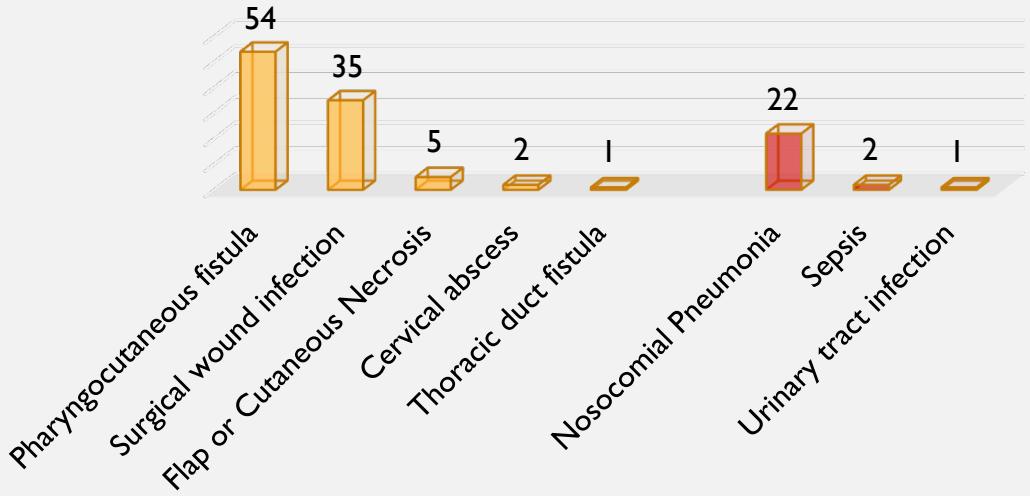
Surgery performed and associated complications

Main complication: Pharyngocutaneous fistula(PCF)

- According to the literature, reported incidences of PCF, vary widely ranging from 3% to 65% (*Paydarfar JA et al. 2006*) Our result (56%) is within the expected range.

Complications (n)



- The most common complications were Pharyngocutaneous fistula (n=54 – 56%) and Surgical wound infection (n=35 – 37%)
- The most common systemic complication was Nosocomial Pneumonia (n=22 – 23%)

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Analyzing Complications

1st treatment modality

	Primary Surgery	Primary CRT	*p value*
Pharyngocutaneous fistula (n)	41	13	ns*
Surgical wound infection (n)	31	4	ns*
Flap or Cutaneous Necrosis (n)	3	2	ns**
Others			
Nosocomial Pneumonia (n)	21	1	ns**

Reconstruction

Reconstructive	Non Reconstructive	*p value*
15	39	ns*
15	20	ns*
5	0	**,002 ** **
6	16	ns*

Body Mass Index

BMI < 25	BMI >= 25	*p value*
48	6	**,05***
26	9	ns*
4	1	ns**
16	6	ns**

Albuminemia

Albumin < 3,8 g/dL	Normal Albumin	*p value*
45	7	ns*
28	4	ns**
4	1	ns**
17	3	ns**

Pre op Hemoglobin

	Anemia pre op	Normal Hg pre op	*p value*
Pharyngocutaneous fistula (n)	33	21	ns*
Surgical wound infection (n)	18	17	ns*
Flap or Cutaneous Necrosis (n)	2	3	ns**
Others			
Nosocomial Pneumonia (n)	11	11	ns*

Ref. Values
♂ < 13,5 g/dL
♀ < 12,0 g/dL

* - χ^2 test; ** - Fisher's exact test; **ns** – non significant

- There is a **positive association, with statistical relevance,** between reconstructive surgery and flap/cutaneous necrosis , and lower BMI and pharyngocutaneous fistula.
- All the others variables were non-significant, but, in our sample:
  - Complications occurred no matter the treatment modality
  - Lower BMI, Hypoalbuminemia and pre operative anemia had more complications as expected.

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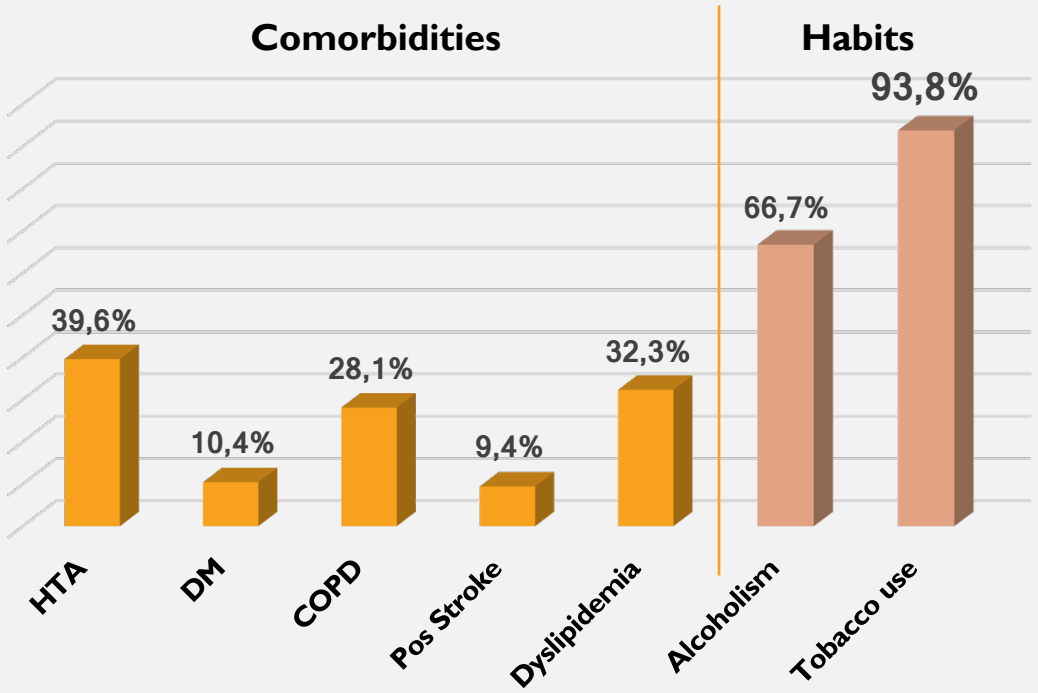
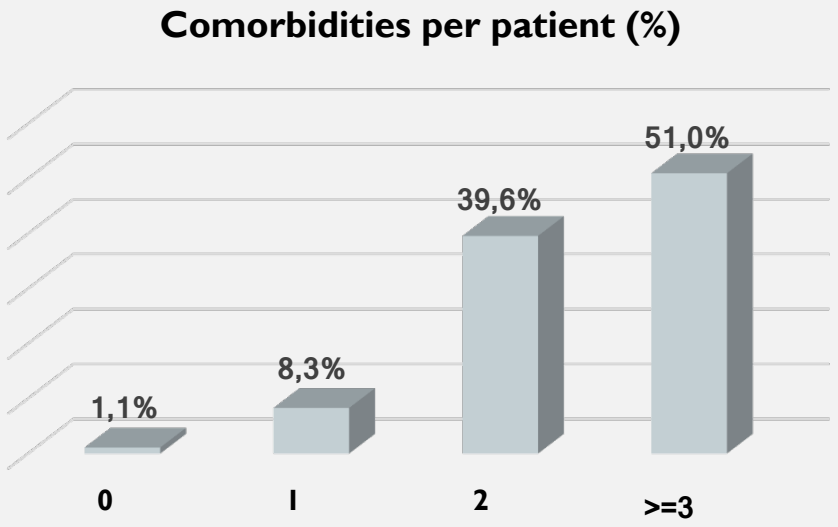
Analyzing Comorbidities/Habits





- Except for the **positive association between alcoholism and nosocomial pneumonia (χ^2 test – *p value* =0,026)**, there isn't any kind of association between complications occurrence and co-morbidities/habits.

- The most common comorbidity was **arterial hypertension** and almost all the patients were **smokers**.
- **Half of our sample had 3 or more co-morbidities being in line with a ASA stage.**

- **These facts show us that there are pernicious elements that may complicate the post-op period, besides the oncologic disease itself.**

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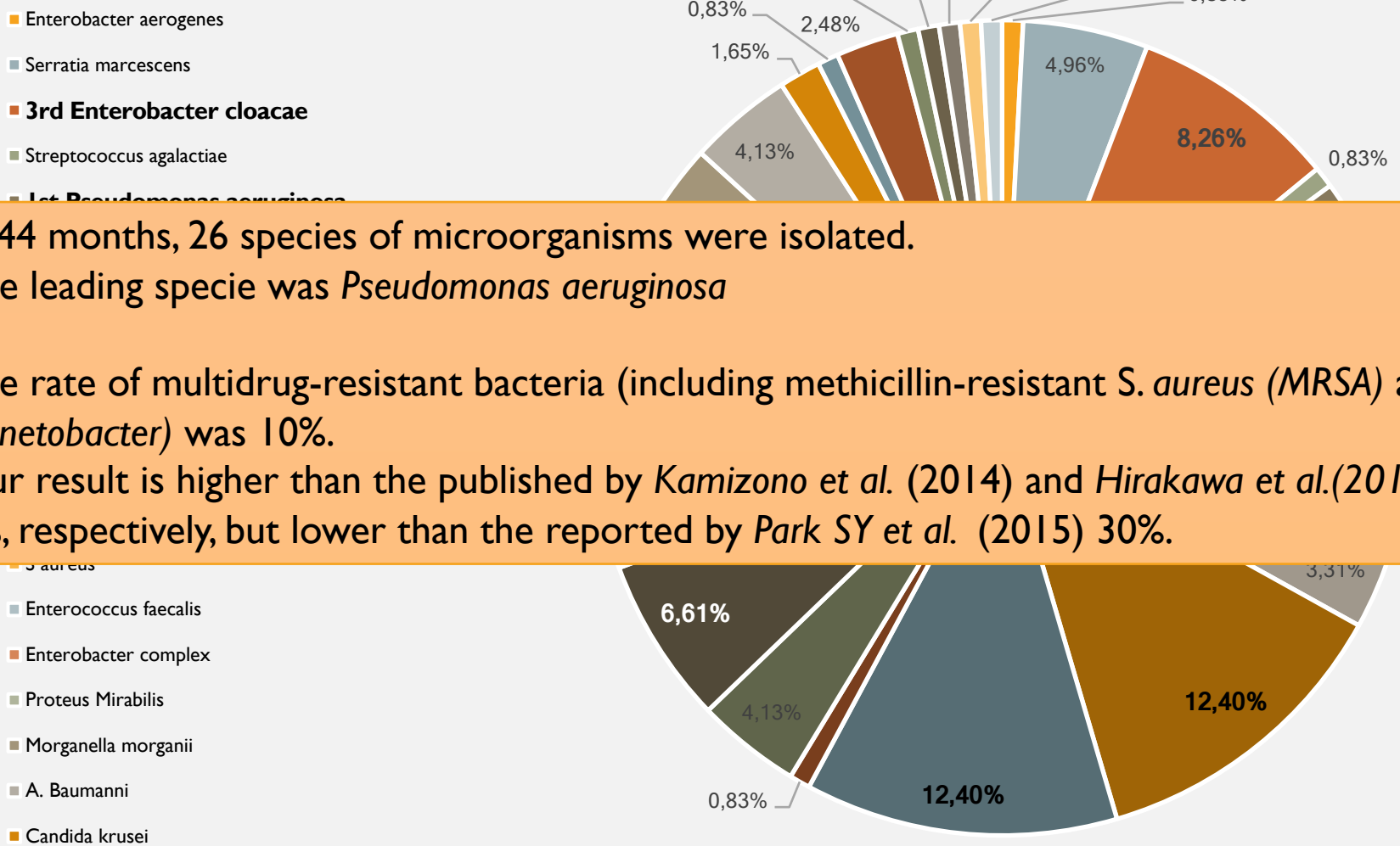
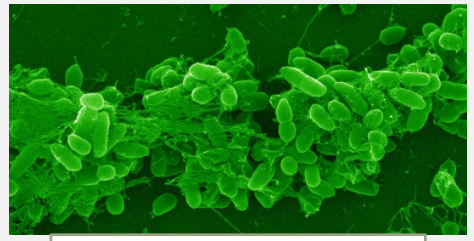
Overall Isolated Microorganisms





1st agent - *Pseudomonas aeruginosa*
n= 18 isolated cases

- ✓ In 44 months, 26 species of microorganisms were isolated.
- ✓ The leading specie was *Pseudomonas aeruginosa*
- ✓ The rate of multidrug-resistant bacteria (including methicillin-resistant S. *aureus (MRSA)* and *Acinetobacter)* was 10%.
- ✓ Our result is higher than the published by *Kamizono et al.* (2014) and *Hirakawa et al.(2013)* - 3% and 7%, respectively, but lower than the reported by *Park SY et al.* (2015) 30%.

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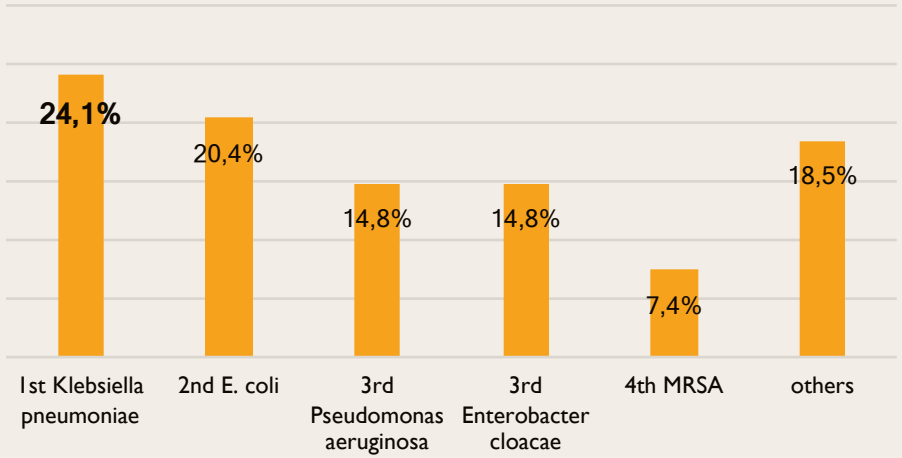
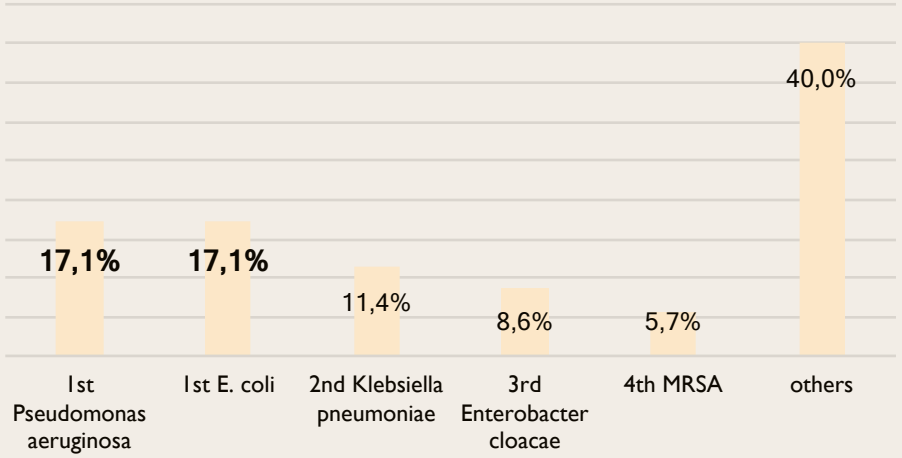
Isolated Microorganisms by Complications

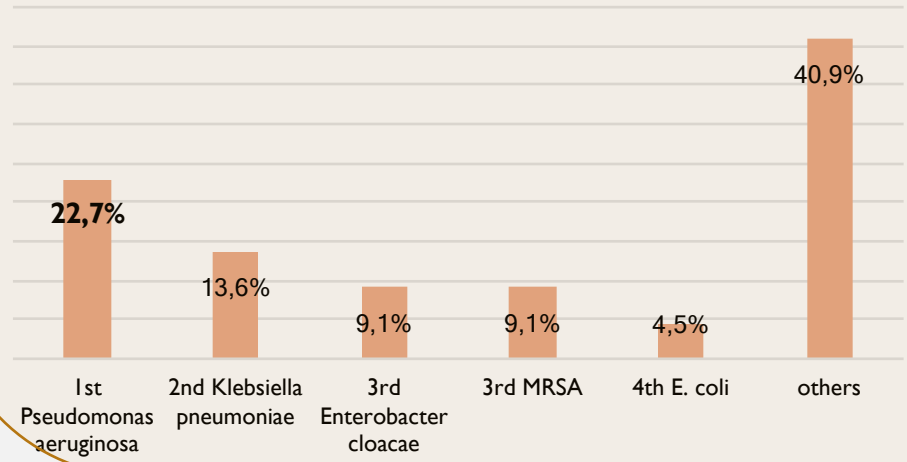
Pharyngocutaneous fistula



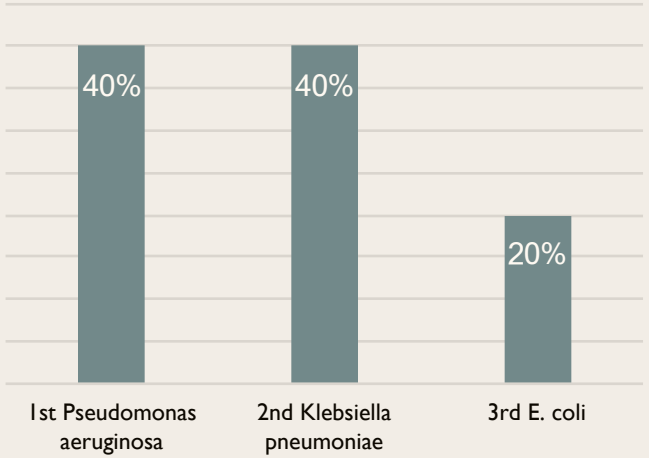
Surgical wound infection



Nosocomial Pneumonia

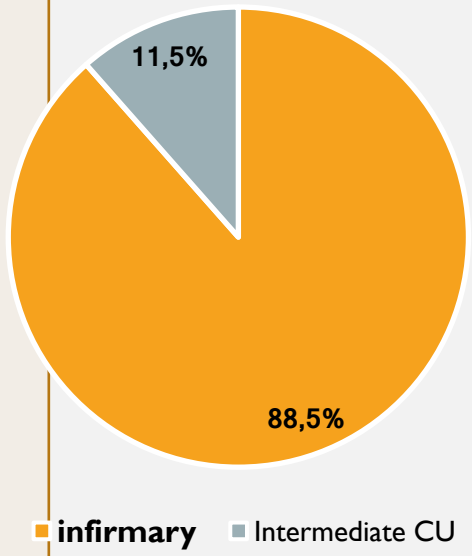


Flap or Cutaneous Necrosis



Local of detection

Where?



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Which complication has higher correlation with the hospitalization length? → Multiple Linear Regression

The impact of complications in the hospitalization length

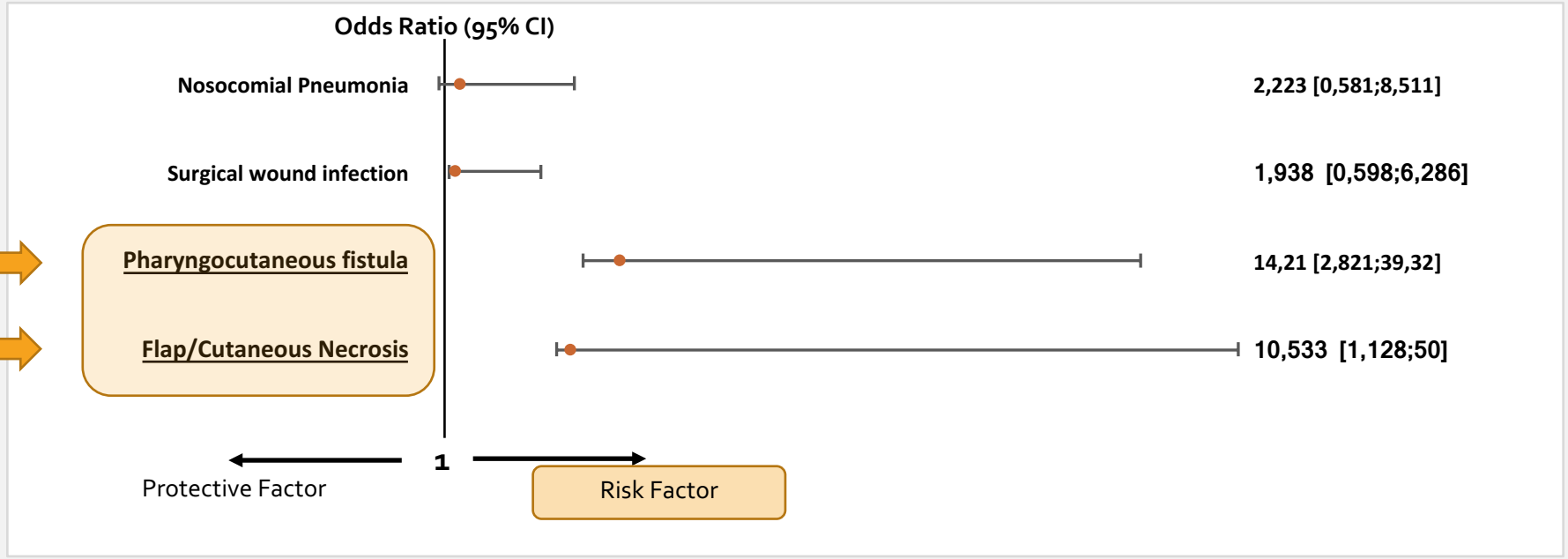
Complications	β (CI 95%)	*p value*
Flap or Cutaneous Necrosis	**18,2** (4,3 – 32,2)	**< 0,001**
Pharyngocutaneous fistula	**13,6** (6,3 – 20,9)	**0,011**
Surgical wound infection	1,8 (-4,9 – 8,6)	0,590
Nosocomial Pneumonia	2,2 (-5,8 – 10,0)	0,589

- **Flap or Cutaneous Necrosis** and **Pharyngocutaneous fistula** are complications with statistical significance that extend inpatient stay

The impact of complications in hospitalization length

Which complication is a **risk factor for more than 30 days of inpatient stay**?

→ Binary Logistic Regression



- **Flap or Cutaneous Necrosis** and **Pharyngocutaneous fistula** are risk factors for more than 30 days of hospitalization

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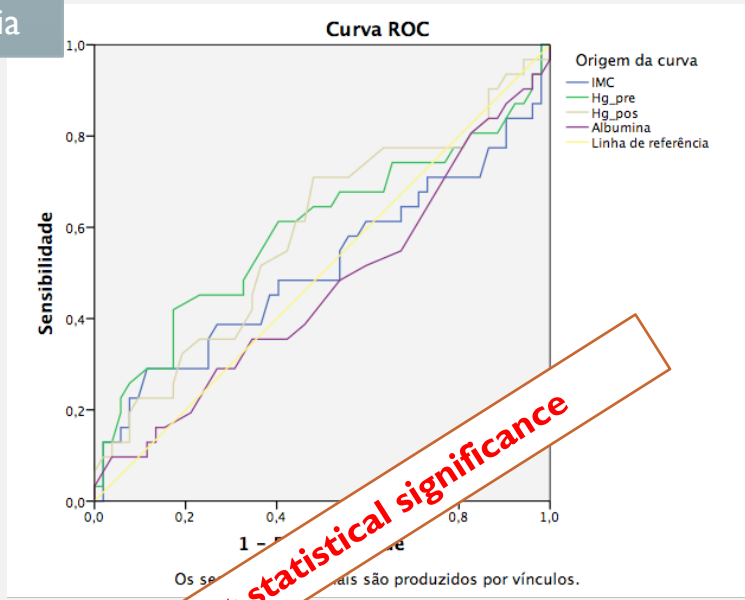
ROC curve for Pharyngocutaneous fistula

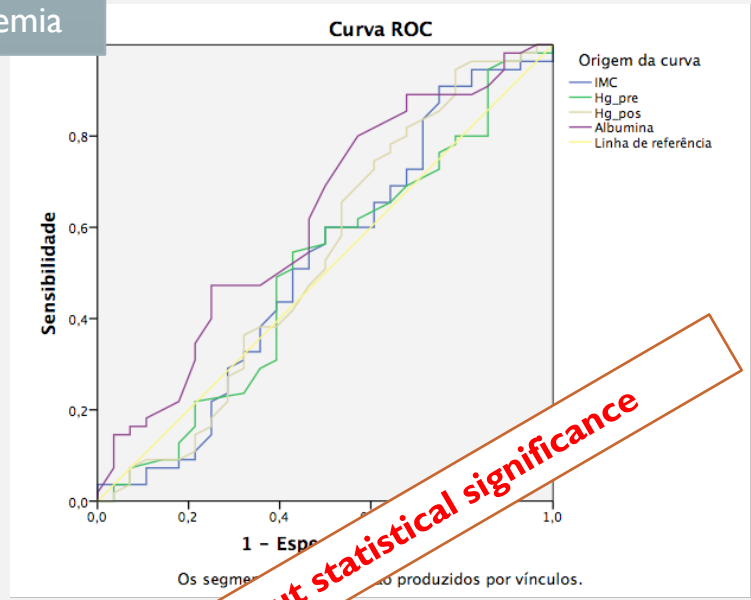
- BMI
- Pre-op Hemoglobin
- Post-op Hemoglobin
- Albuminemia



Without statistical significance

ROC curve for Surgical wound infection

- BMI
- Pre-op Hemoglobin
- Post-op Hemoglobin
- Albuminemia



Without statistical significance

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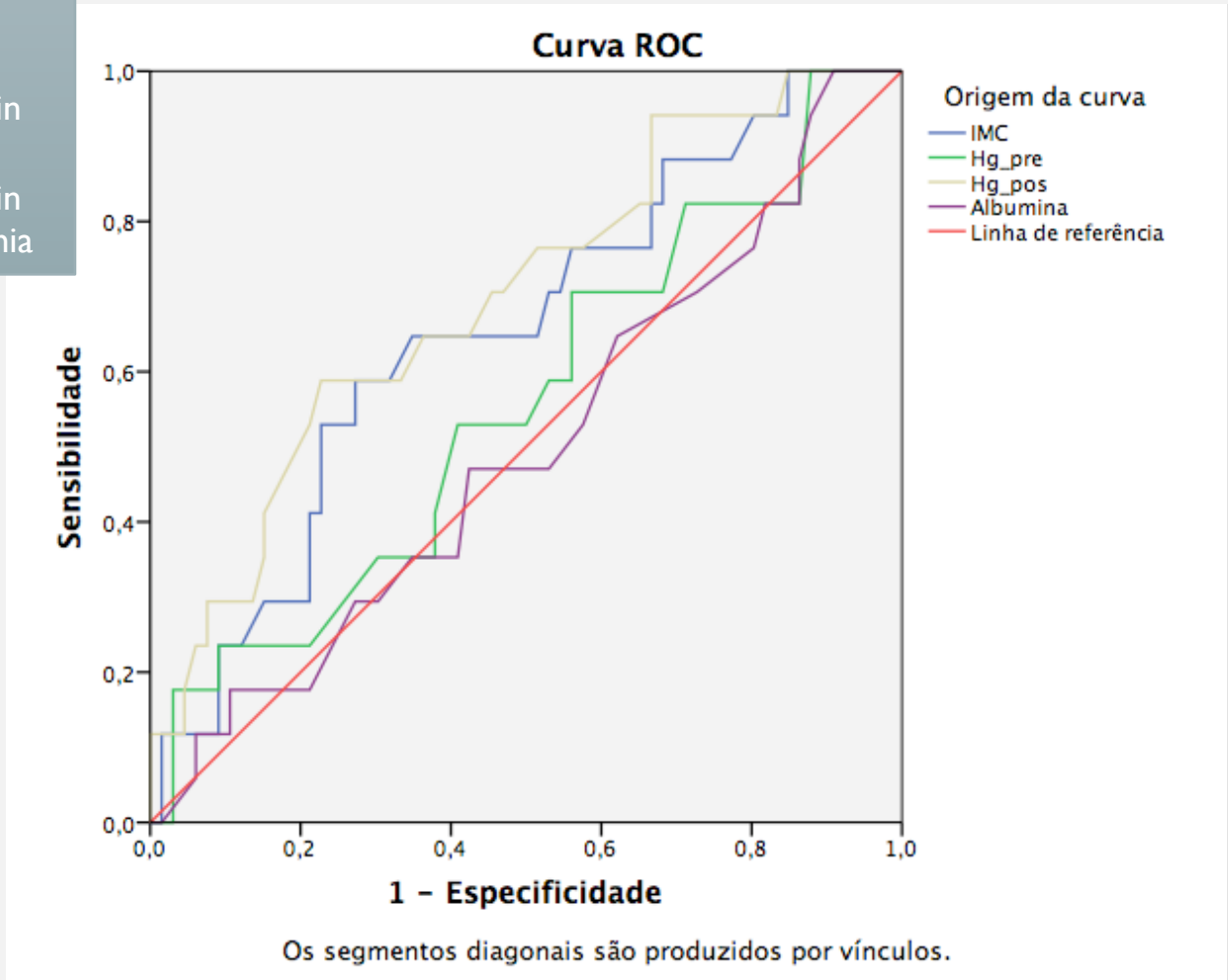
ROC curve for Nosocomial Pneumonia

- BMI
- Pre-op Hemoglobin
- Post-op Hemoglobin
- Albuminemia



	Best value	AUC	*p value*	CI (95%)
Hg pos-op	**<10** Specificity 85% Sensitivity 42%	**70%**	0,012	0,559 – 0,838
BMI	**<24** Specificity 82% Sensitivity 30%	**65%**	0,05	0,509 – 0,797

- ✓ **Pos-op hemoglobin < 10** had an acceptable discrimination to the ocurrence of pos op Nosocomial Pneumonia
- ✓ **BMI < 24** had lower power of discrimination to the ocurrence of pos op Nosocomial Pneumonia

ROC curve for Pharyngocutaneous fistula and Surgical wound infection did not have statistical relevance

Main limitations of our Study

- Selection bias
- Without control group
- Retrospective study

VS

Best facts of our Study

- We found risk factors that can extend hospitalization length
- We revelead cut-off values in order to predict Nosocomial Pneumonia (BMI and Pre op Hemoglobin)
- We showed a statistical relationship between BMI<25 and PCF

5 – CONCLUSION

- Our main complication was Pharyngocutaneous fistula
  - ✓ We need more prospective studies
- The most common pathogen was *Pseudomonas aeruginosa*
- BMI<25 was statistically linked to Pharyngocutaneous fistula
- Post op hemoglobin and BMI can predict Nosocomial Pneumonia
- **Flap or Cutaneous Necrosis** and **Pharyngocutaneous fistula** are risk factors for more than 30 days of hospitalization

MUCHAS GRACIAS

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