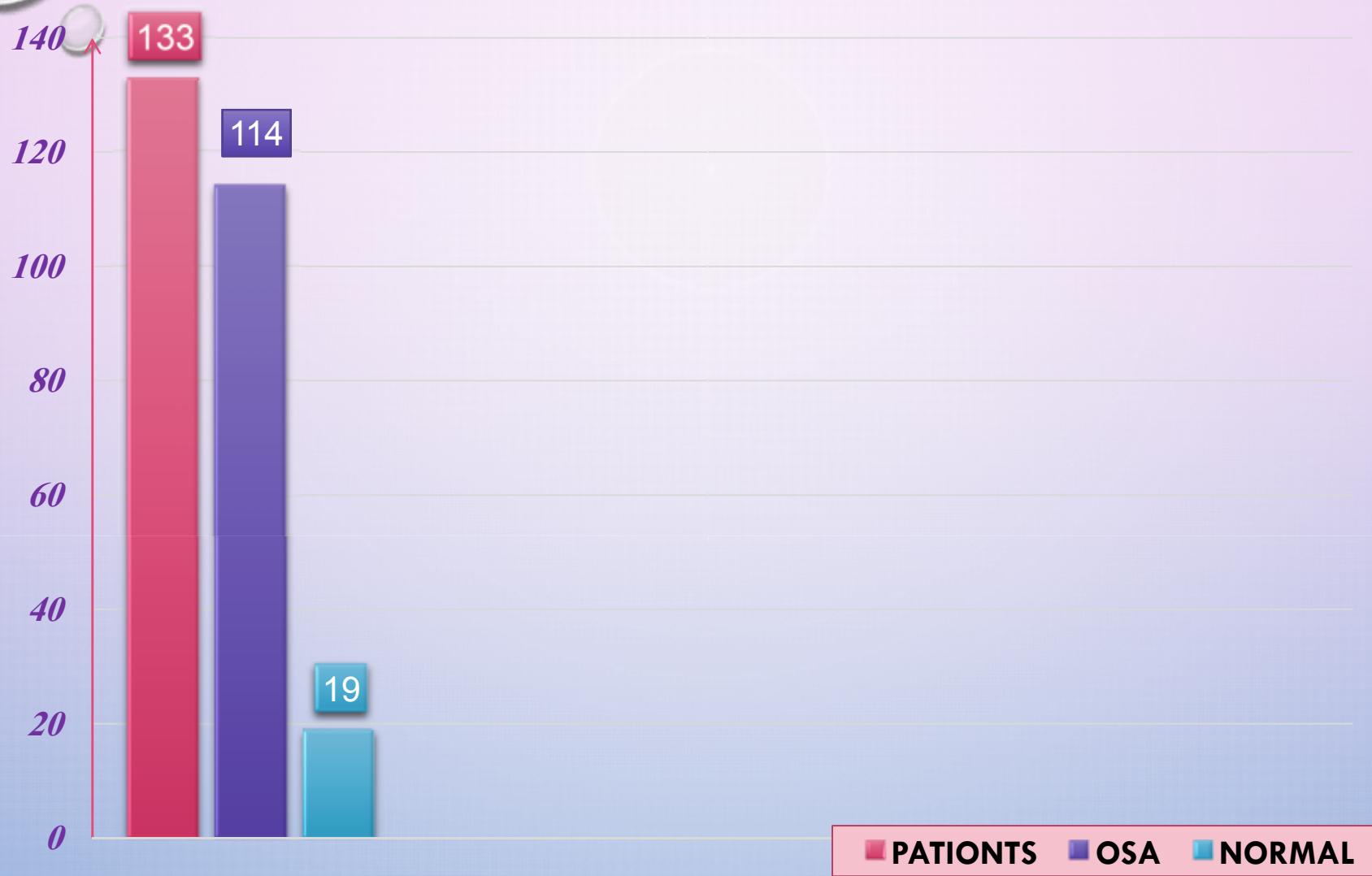




Sleep Apnea study

**Dr. Alaa
Alkhalili**



86%

14%

OSA DIAGNOSIS:

AHI: ≥ 15 /hour or RDI: ≥ 15 / hour in asymptomatic patient.

AHI: ≥ 5 /hour or RDI: ≥ 5 / hour in a patient with symptoms or signs of disturbed sleep

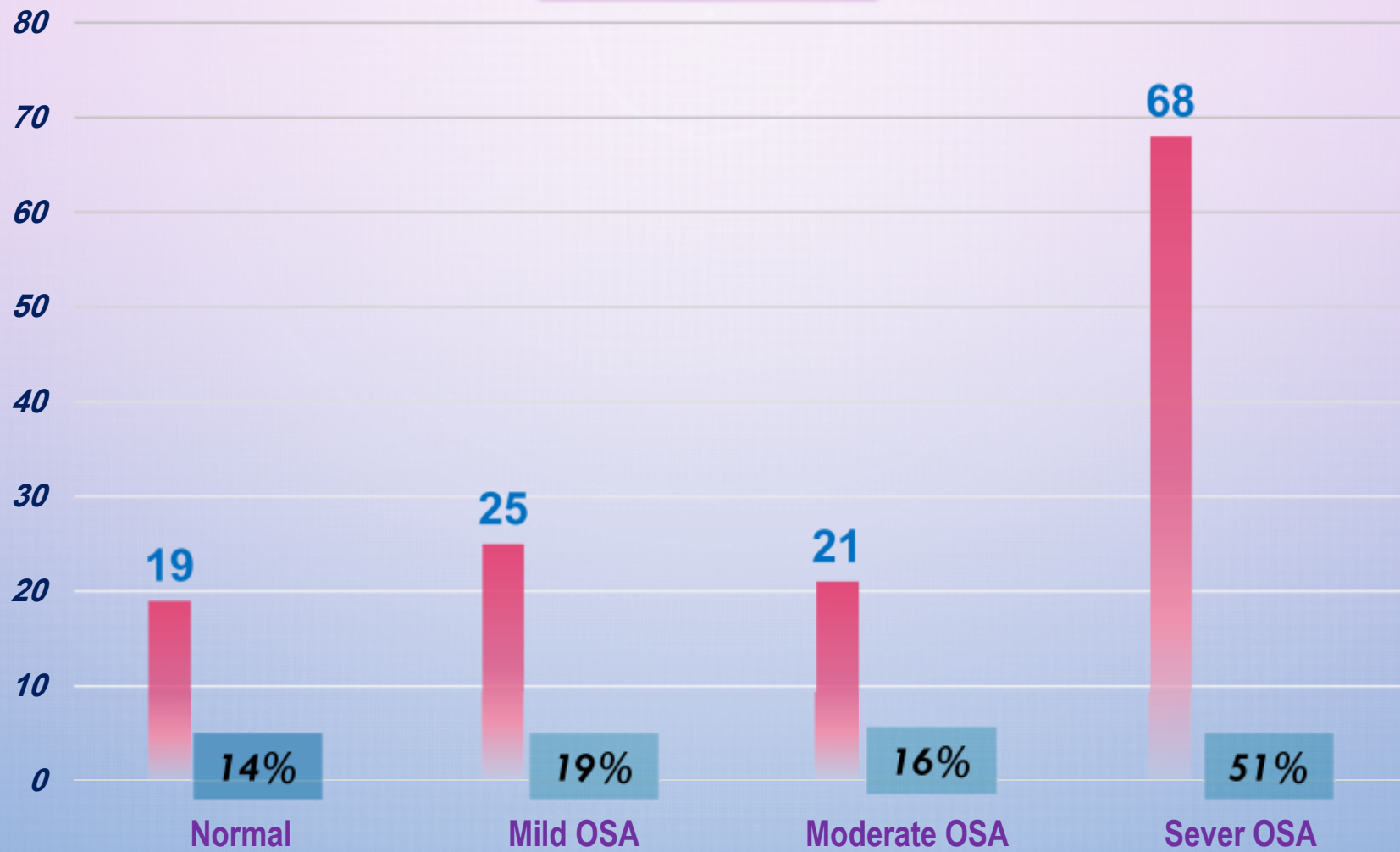
DISEASE SPECTRUM:

Mild OSA: AHI: 5-15/hour.

Moderate OSA :AHI: 15-30/hour.

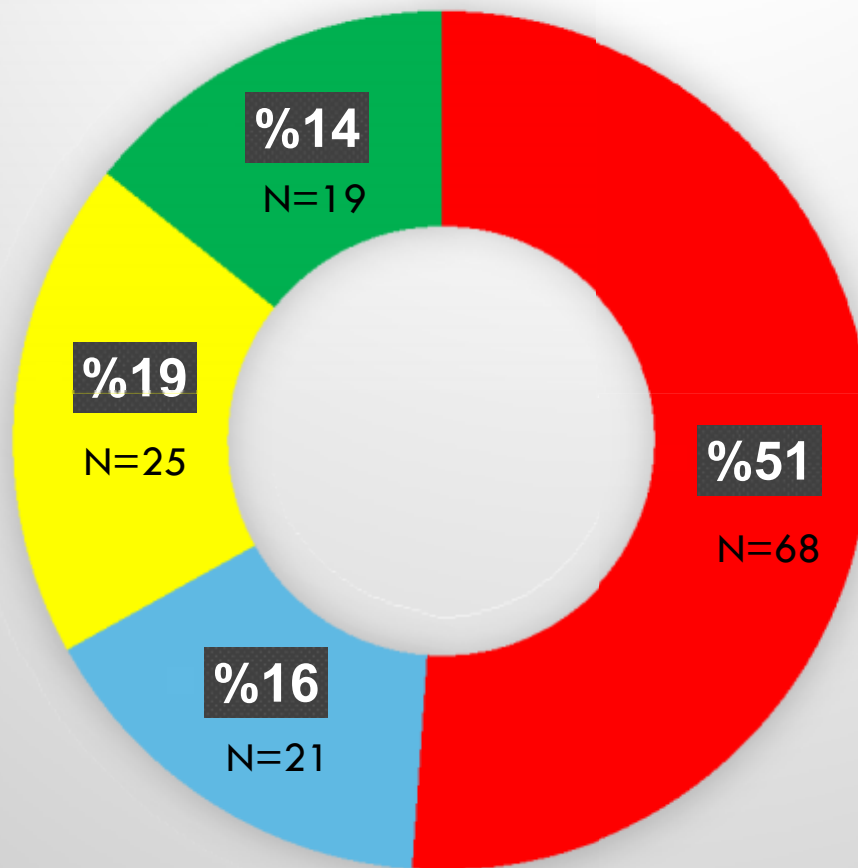
Severe OSA :AHI > 30 /hour or $\text{SaO}_2 < 90\%$ more than 20% total sleep time.

SLEEP APNEA TEST



Patientes

Total Number: 133



■ Sever OSA

■ Moderate OSA

■ Mild OSA

■ Normal

1st Case



ASSAD UNIVERSITY HOSPITAL
PULMONOLOGY DEPARTMENT

Physician:

Scorer:

Tel.:

Email:

Address: SYRIA

DAMASCUS

Fax :

Internet:

53 سنة.

5 باكيت / سنة.

نهارى + شخير ليلي.

Patient Data

Last Name:	ination	ID:	402367	Height:
First Name:	raje	Crit. 1		Weight:
Date of Birth:	10/25/1965	Crit. 2		BMI:

Description

	from	to	Duration	Rec
Recorded Time	11/4/2019 11:31:03 AM	11/4/2019 1:29:00 PM	01:57:57	SOMNOW
TIB	11/4/2019 11:31:03 AM	11/4/2019 1:29:00 PM	01:57:57	

+

CPAP

Respiratory Analysis

Number (Index)

Active	4
Mixed	-
Central	-
Undef A.	-
Total Apn.	41 (21.9)
Apnea	4
A+H	87
Limitations	-
RERAs	-
RDI	87 (46.4)

Respiratory Analysis

Number (Index)

Active	1 (0.3)
Mixed	-
Central	1 (0.3)
Undef A.	-
Total Apn.	2 (0.7)
Apnea	5 (1.7)
A+H	7 (2.4)
Limitations	-
RERAs	-
RDI	7 (2.4)

O2 saturation

	Number (Index)	Time
Number of Desaturations	82 (44.0)	
SpO2 (%)	82	12:32:38
Desaturation	2	
Average SpO2	91	
< 90 %	78	28.0 %
Number < 80 %	-	0.0 %
< 90 %	%	00:25:06
Biggest Desaturation (%)	12	12:32:14
Average Desaturation [%]	6.5	24.4 s
Longest Desaturation (s)	63.0	11:44:28
Average Min. Desaturation	87	
Deepest Desaturation (%)	82	12:32:38
Sum all desaturation	00:33:18	29.8 %
Average SpO2 Delay (s)	26.3	
Artefact (min)	0.7 (0.6%)	

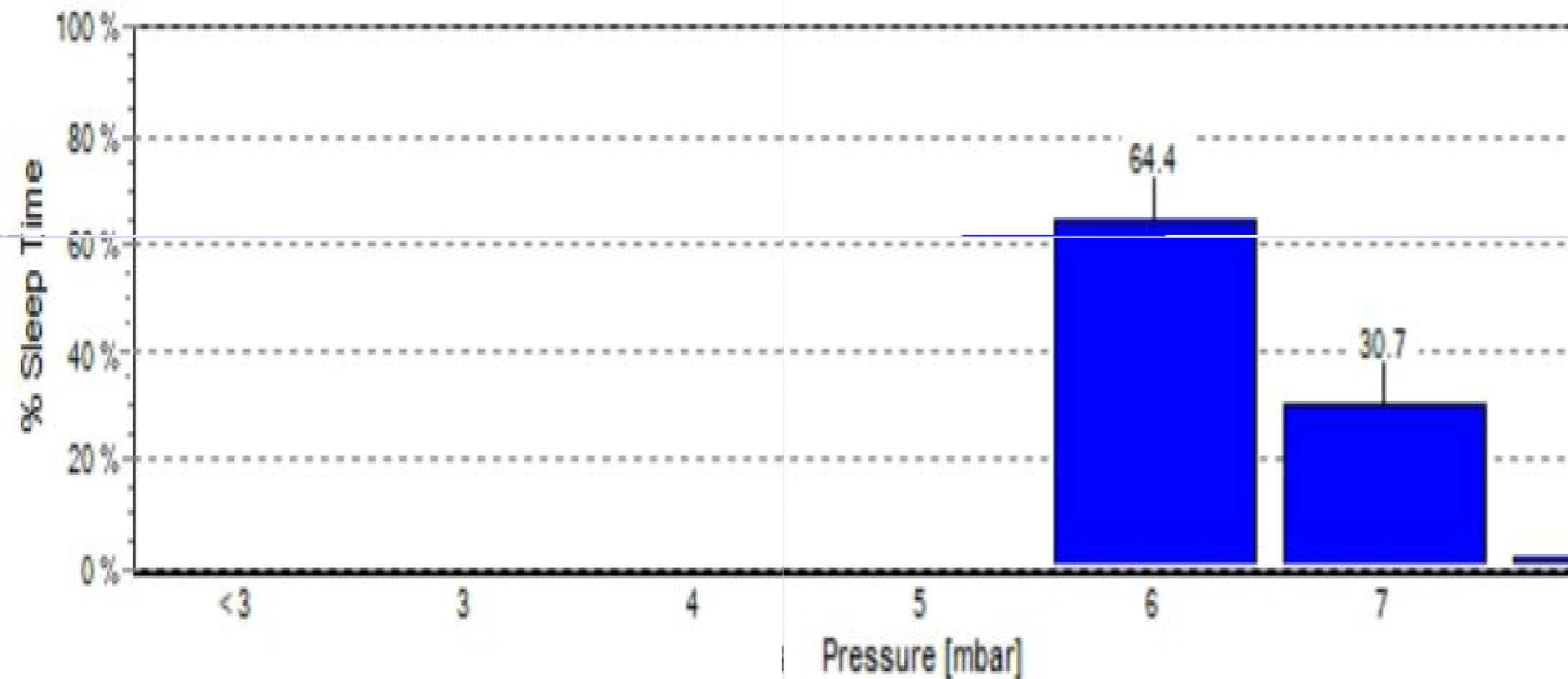
O2 saturation

+

	Number (Index)	Time
Number of Desaturations	6 (2.1)	
SpO2 (%)	89	09:43:23
Desaturation	92	
Average SpO2	92	
< 90 %	1	0.3 %
Number < 80 %	-	0.0 %
< 90 %	0.2 %	00:17
Biggest Desaturation (%)	5	09:43:01
Average Desaturation [%]	4.2	29.5 s
Longest Desaturation (s)	58.0	09:47:44
Average Min. Desaturation	90	
Deepest Desaturation (%)	89	09:43:23
Sum all desaturation	00:02:57	1.7 %
Average SpO2 Delay (s)	28.8	
Artefact (min)	1.1 (0.6%)	

CPAP pressure

Average CPAP	6.4 mbar
--------------	----------



Summary

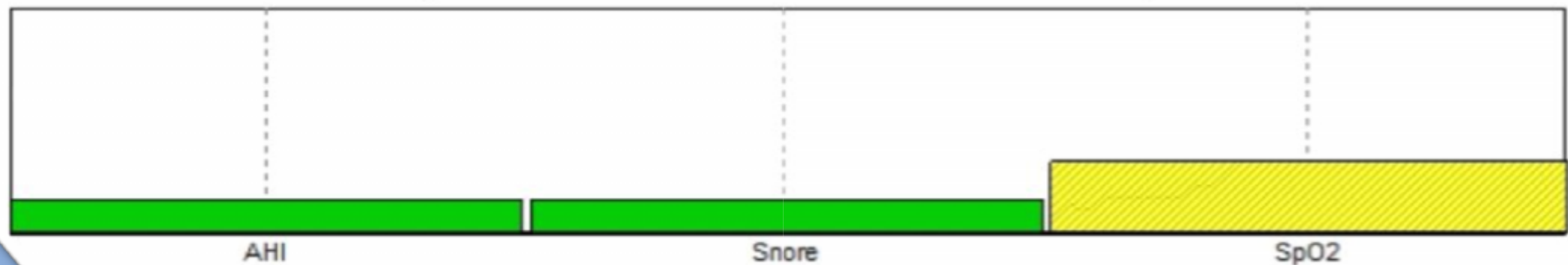
■ Normal ■ Mild ■ Moderate ■ Severe



+
CPAP

Summary

■ Normal ■ Mild ■ Moderate ■ Severe



2nd Case



**ASSAD UNIVERSITY HOSPITAL
PULMONOLOGY DEPARTMENT**

Physician:

Scorer:

Tel.:

Email:

Address: SYRIA
DAMASCUS

Fax :
Internet:

العمر: 45 سنة.

تدخين سلبي

نعاس نهاري

ABGs : N, PFTs: N

Patient Data

auto

Last Name:	abrahem	ID:	38982	Height:	156 cm
First Name:	aesha	Crit. 1		Weight:	142.0 kg
Date of Birth:	8/26/1970	Crit. 2		BMI:	58.3 kg/m ²

Description

	from	to	Duration	Recorder
Recorded Time	8/26/2019 10:48:48 AM	8/26/2019 1:47:48 PM	02:59:00	SOMNOtouch RESP
TIB	8/26/2019 10:48:48 AM	8/26/2019 1:47:48 PM	02:59:00	

+

CPAP

Respiratory Analysis

Number (Index)

Obstructive	156
Mixed	-
Central	1 (0.5)
Undef A.	-
Total Apn.	157 (85.6)
Respiratory Disturbance Index	22
Apnea-Hypopnea Index	179 (97.6)
Limitations	-
RERAs	-
RDI	179 (97.6)

Respiratory Analysis

Number (Index)

Obstructive	224 (75.6)
Mixed	-
Central	14 (4.7)
Undef A.	-
Total Apn.	238 (80.4)
Respiratory Disturbance Index	70 (23.6)
Apnea-Hypopnea Index	308 (104.0)
Limitations	-
RERAs	-
RDI	308 (104.0)

+

CPAP

O2 saturation

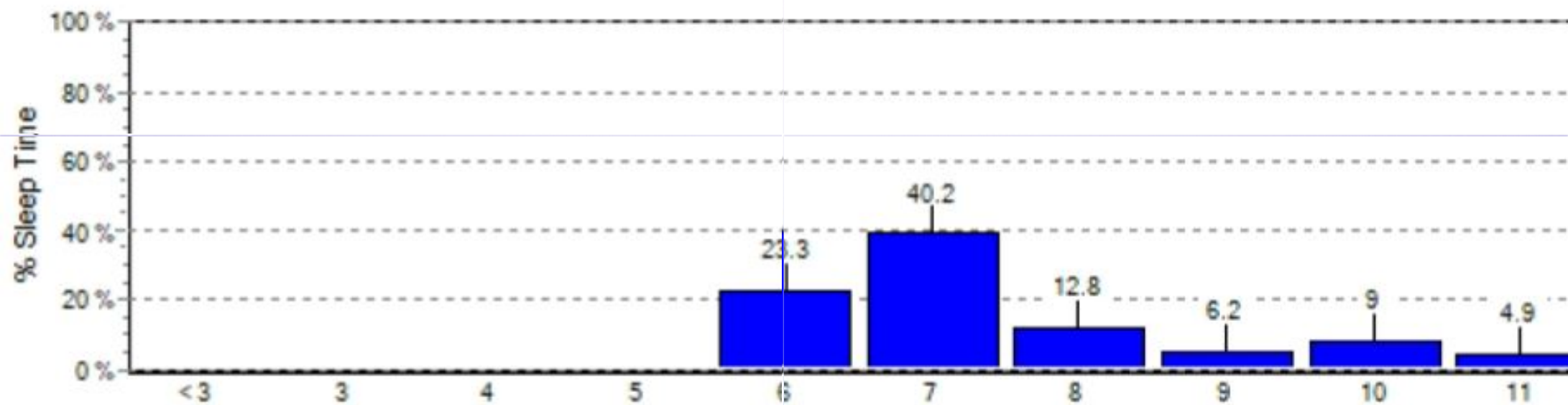
	Number (Index)	Time
Number of Desaturations	133 (73.0)	
[REDACTED] (%)	1	10:02:37
[REDACTED]	2	
Average SpO2	91	
[REDACTED] 0 %	7	24.9 %
Number < 80 %	-	0.0 %
[REDACTED] 90 %	[REDACTED]	00:31:04
Biggest Desaturation (%)	11	10:16:50
Average Desaturation [%]	6.3	13.2 s
Longest Desaturation (s)	32.0	09:30:59
Average Min. Desaturation	86	
Deepest Desaturation (%)	81	10:02:37
Sum all desaturation	00:29:09	26.7 %
Average SpO2 Delay (s)	24.1	
Artefact (min)	0.7 (0.7%)	

O2 saturation

	Number (Index)	Time
Number of Desaturations	275 (92.9)	
[REDACTED]	82	[REDACTED] 34:58
[REDACTED]	95	[REDACTED]
Average SpO2	93	
[REDACTED] 0 %	145	[REDACTED] 22.8 %
Number < 80 %	-	0.0 %
[REDACTED] 90 %	13.8 %	00:24:31
Biggest Desaturation (%)	13	12:34:43
Average Desaturation [%]	6.1	15.6 s
Longest Desaturation (s)	36.0	12:46:17
Average Min. Desaturation	89	
Deepest Desaturation (%)	82	12:34:58
Sum all desaturation	01:11:23	40.2 %
Average SpO2 Delay (s)	21.2	
Artefact (min)	0.1 (0.1%)	

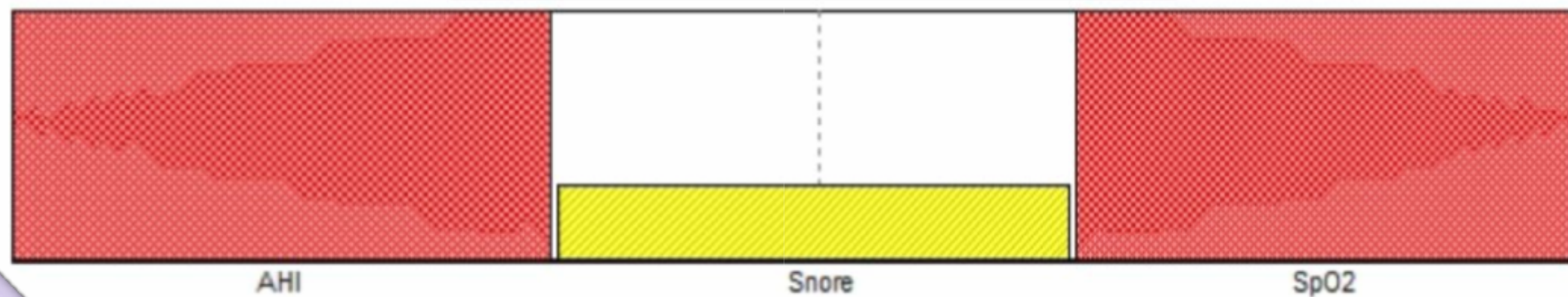
CPAP pressure

Average CPAP	7.7 mbar
--------------	----------



Summary

■ Normal ■ Mild ■ Moderate ■ Severe

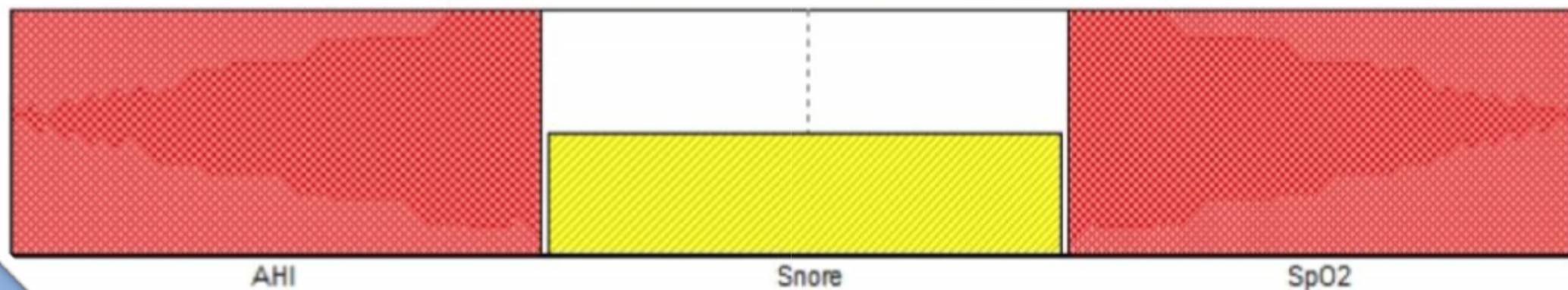


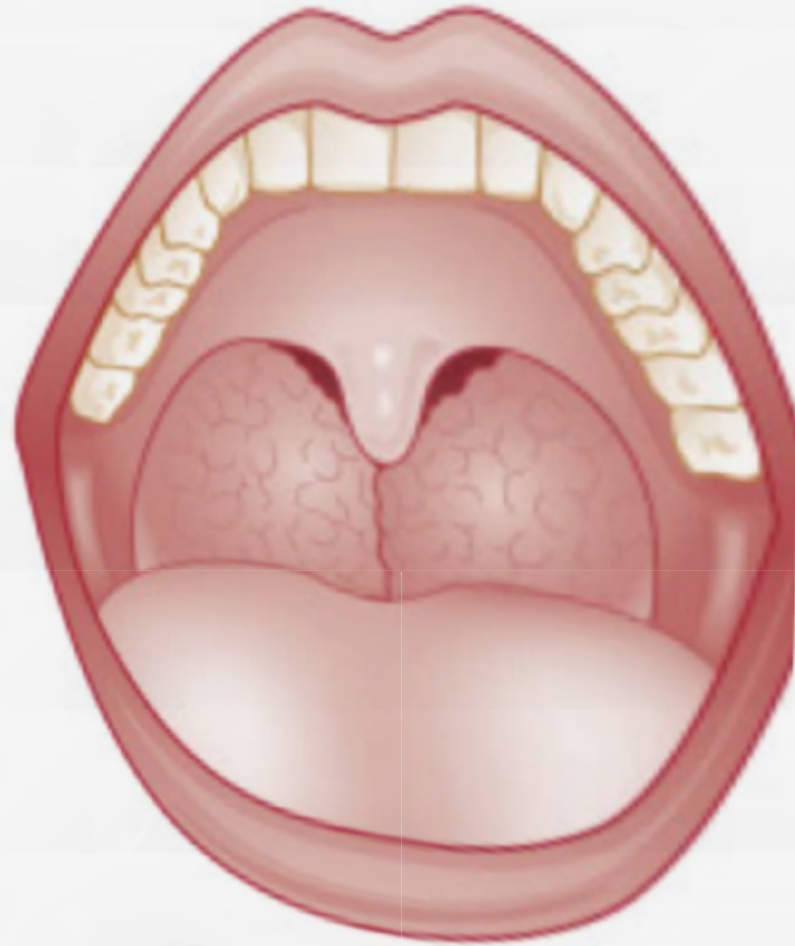
+

CPAP

Summary

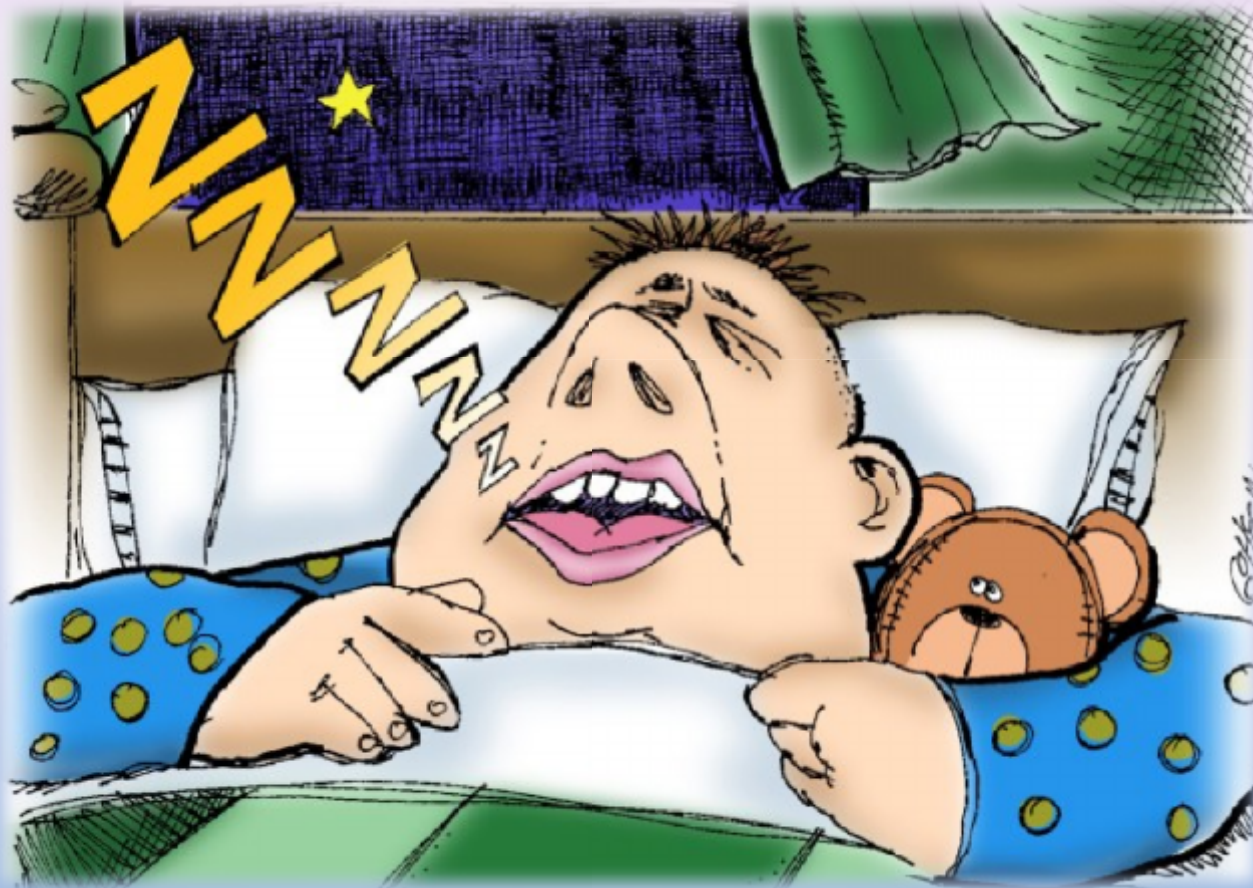
■ Normal ■ Mild ■ Moderate ■ Severe





Tonsils, size 4,
extend to the midline.

3rd Case



ASSAD UNIVERSITY HOSPITAL
PULMONOLOGY DEPARTMENT

Physician:
Scorer:
Tel.:
Email:

Address: SYRIA
DAMASCUS

Fax :
Internet:

العمر: 55 سنة.
مدخن 50 باكيت / سنة
شخير ليلي + ارتفاع توتر

Patient Data

auto

Last Name:	al deba	ID:	110257	Height:	158 cm
First Name:	m hmad amen	Crit. 1		Weight:	112.0 kg
Date of Birth:	7/15/1965	Crit. 2		BMI:	44.9 kg/m²

Description

from		to	Duration	Recorder
Recorded Time	7/17/2019 8:31:34 AM	7/17/2019 10:29:34 AM	01:58:00	SOMNOtouch RESP
TIB	7/17/2019 8:31:34 AM	7/17/2019 10:29:34 AM	01:58:00	

+

CPAP

Respiratory Analysis

Number (Index)	
Obstructive	-
Mixed	-
Central	-
Undef A.	-
Total Apn.	-
76	76
A+H	76 (22.2)
Limitations	-
RERAs	-
RDI	76 (39.8)

Respiratory Analysis

Number (Index)	
Obstructive	6 (2.0)
Mixed	1 (0.3)
Central	3 (1.0)
Undef A.	-
Total Apn.	10 (3.4)
112	112
A+H	122 (41.1)
Limitations	-
RERAs	-
RDI	122 (41.1)

+

CPAP

O2 saturation

	Number (Index)	Time
Number of Desaturations	97 (50.9)	
[REDACTED])	81	08:45:52
[REDACTED] n	[REDACTED]	
Average SpO2	88	
[REDACTED] %	[REDACTED]	35.6 %
Number < 80 %	-	0.0 %
[REDACTED]	[REDACTED]	01:19:05
Biggest Desaturation (%)	10	09:25:52
Average Desaturation [%]	5.5	25.2 s
Longest Desaturation (s)	47.0	08:43:48
Average Min. Desaturation	85	
Deepest Desaturation (%)	81	08:45:52
Sum all desaturation	00:40:42	35.6 %
Average SpO2 Delay (s)	29.8	
Artefact (min)	0.1 (0.1%)	

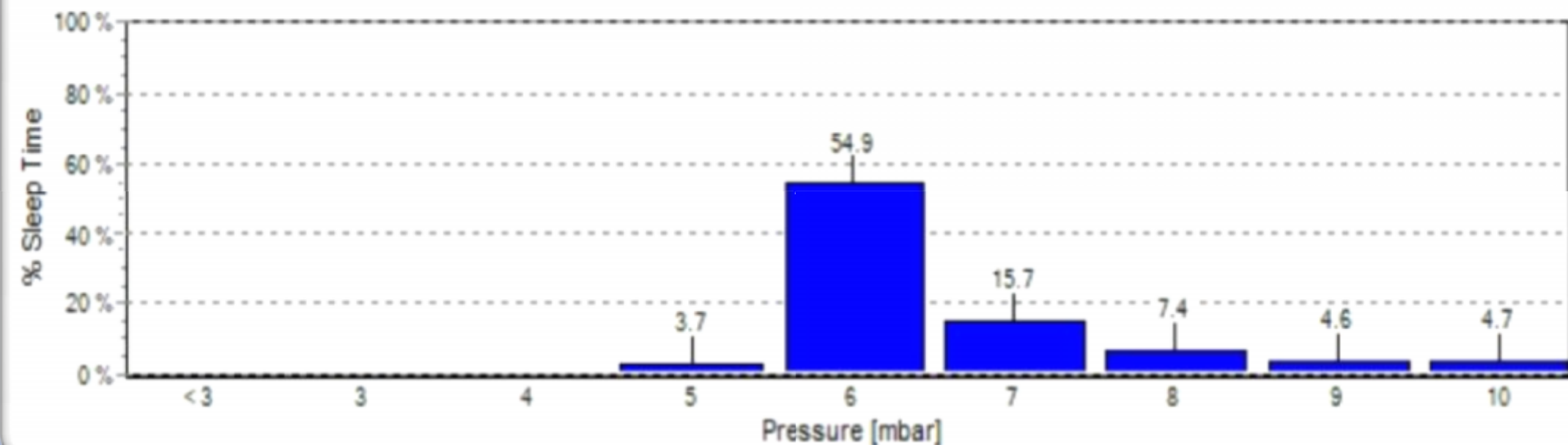
O2 saturation

	Number (Index)	Time
Number of Desaturations	136 (45.8)	
[REDACTED]	80	11:42:42
[REDACTED]	92	
Average SpO2	92	
[REDACTED]	105	28.7 %
Number < 80 %	-	0.0 %
[REDACTED]	18	00:32:05
Biggest Desaturation (%)	15	11:35:26
Average Desaturation [%]	6.1	30.3 s
Longest Desaturation (s)	102.0	10:41:30
Average Min. Desaturation	88	
Deepest Desaturation (%)	80	11:42:42
Sum all desaturation	01:08:42	38.6 %
Average SpO2 Delay (s)	31.8	
Artefact (min)	-	

CPAP pressure

Average CPAP

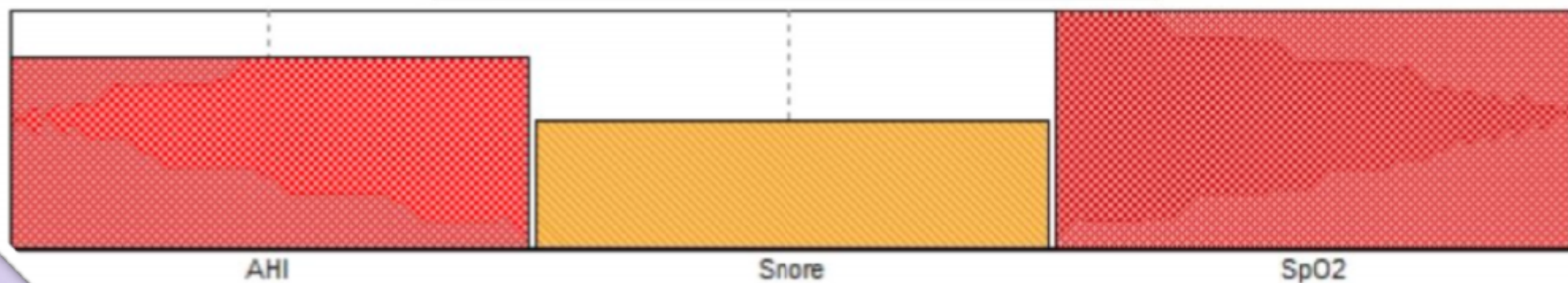
6.3 mbar



Pressure [mbar]

Summary

■ Normal ■ Mild ■ Moderate ■ Severe



+

CPAP

Summary

■ Normal ■ Mild ■ Moderate ■ Severe



ABGs

Sao2	HCO3		PCO2	PO2	PH
94.7%	24.1		32.4	67	7.49

PFTs

FEF25-75%	FEV1	FVC	FEV1/FVC
27%	53%	63%	68%

إيكو القلب:

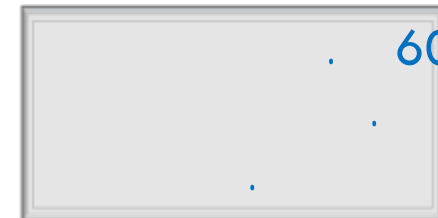
EF: 75% - الضغط الرئوي 60 mm hg

4th case



ASSAD UNIVERSITY HOSPITAL
PULMONOLOGY DEPARTMENT

Address: SYRIA
DAMASCUS



Physician:

Scorer:

Tel.:

Email:

Fax :

Internet:

Patient Data

Last Name:	m h m a d m n e b	ID:	364620	Height:	1
First Name:	a l m n z l g e	Crit. 1		Weight:	8
Date of Birth:	2/14/1956	Crit. 2		BMI:	2

Description

	from	to	Duration	Record
Recorded Time	5/21/2019 1:43:07 PM	5/21/2019 4:43:06 PM	02:59:59	SOMNOtouch
TIB	5/21/2019 1:43:07 PM	5/21/2019 4:43:06 PM	02:59:59	

+

CPAP

Respiratory Analysis

Number (Index)	
Obstructive	15 (6.5)
Mixed	-
Central	6 (2.6)
Undef A.	-
Total Apn.	21 (9.1)
_____a	63 _____
_____H	84 _____
Limitations	-
RERAs	-
RDI	84 (36.5)

Respiratory Analysis

Number (Index)	
Obstructive	39 (13.0)
Mixed	16 (5.3)
_____	103 _____
Undef A.	-
Total Apn.	158 (52.7)
_____	89 _____
_____	247 _____
Limitations	-
RERAs	-
RDI	247 (82.3)

+

CPAP

O2 saturation

	Number (Index)	Time
Number of Desaturations	94 (40.9)	
[redacted] (%)	87	13:57:55
[redacted] on	2	
Average SpO2	92	
[redacted] 90 %	47	10.8 %
Number < 80 %	-	0.0 %
[redacted] 90 %	[redacted] %	00:15:29
Biggest Desaturation (%)	8	13:56:42
Average Desaturation [%]	4.9	19.1 s
Longest Desaturation (s)	76.0	13:45:05
Average Min. Desaturation	90	
Deepest Desaturation (%)	87	13:57:55
Sum all desaturation	00:30:00	21.8 %
Average SpO2 Delay (s)	21.6	
Artefact (min)	0.1 (0.0%)	

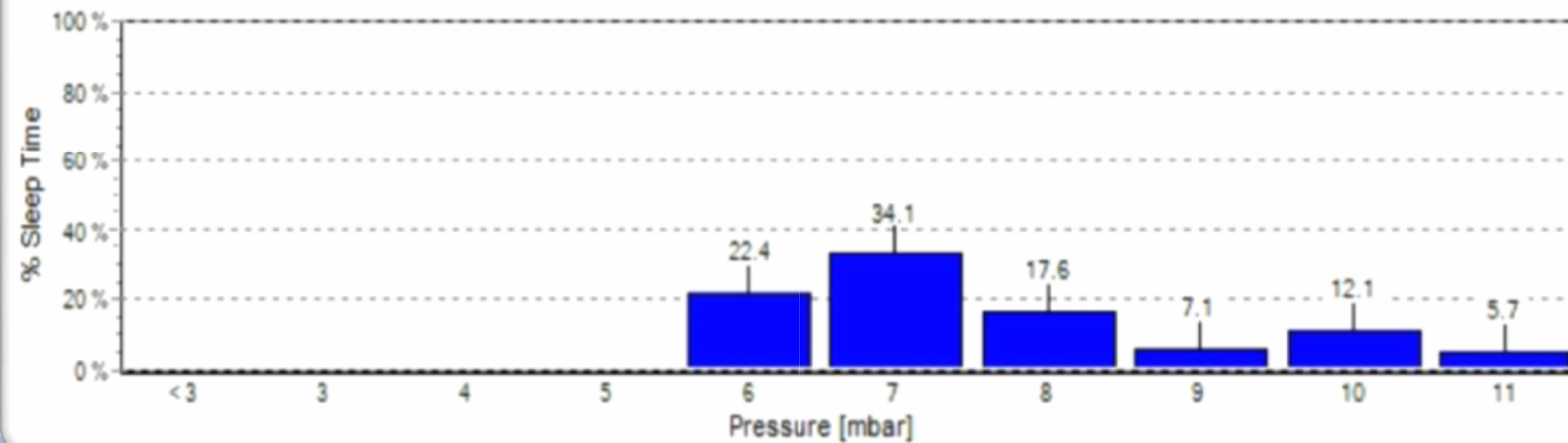
O2 saturation

	Number (Index)	Time
Number of Desaturations	244 (81.4)	
[redacted]	82	[redacted] 14:43:02
[redacted]	93	[redacted]
Average SpO2	91	
[redacted]	217	31.7 %
Number < 80 %	-	0.0 %
[redacted]	25.7 %	[redacted] 0:46:16
Biggest Desaturation (%)	13	16:34:00
Average Desaturation [%]	7.1	16.1 s
Longest Desaturation (s)	69.0	14:01:14
Average Min. Desaturation	87	
Deepest Desaturation (%)	82	14:43:02
Sum all desaturation	01:05:21	36.3 %
Average SpO2 Delay (s)	18.0	
Artefact (min)	0.1 (0.1%)	

CPAP pressure

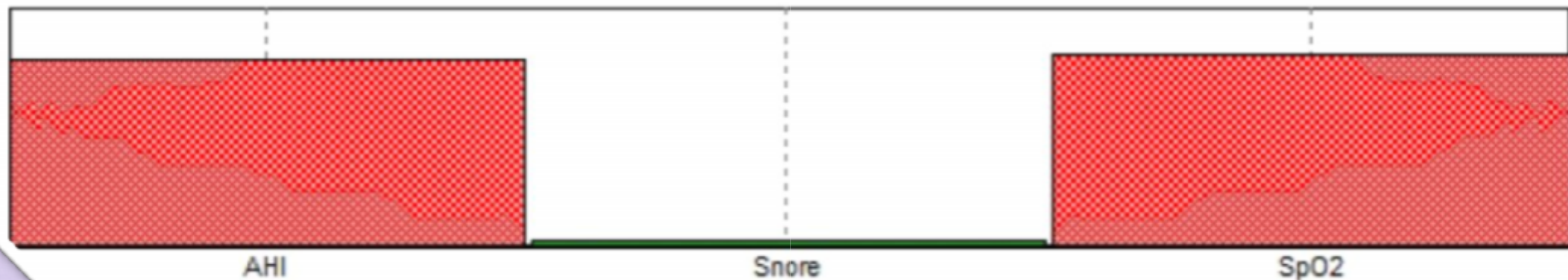
Average CPAP

7.7 mbar



Summary

■ Normal ■ Mild ■ Moderate ■ Severe



+

CPAP

Summary

■ Normal ■ Mild ■ Moderate ■ Severe





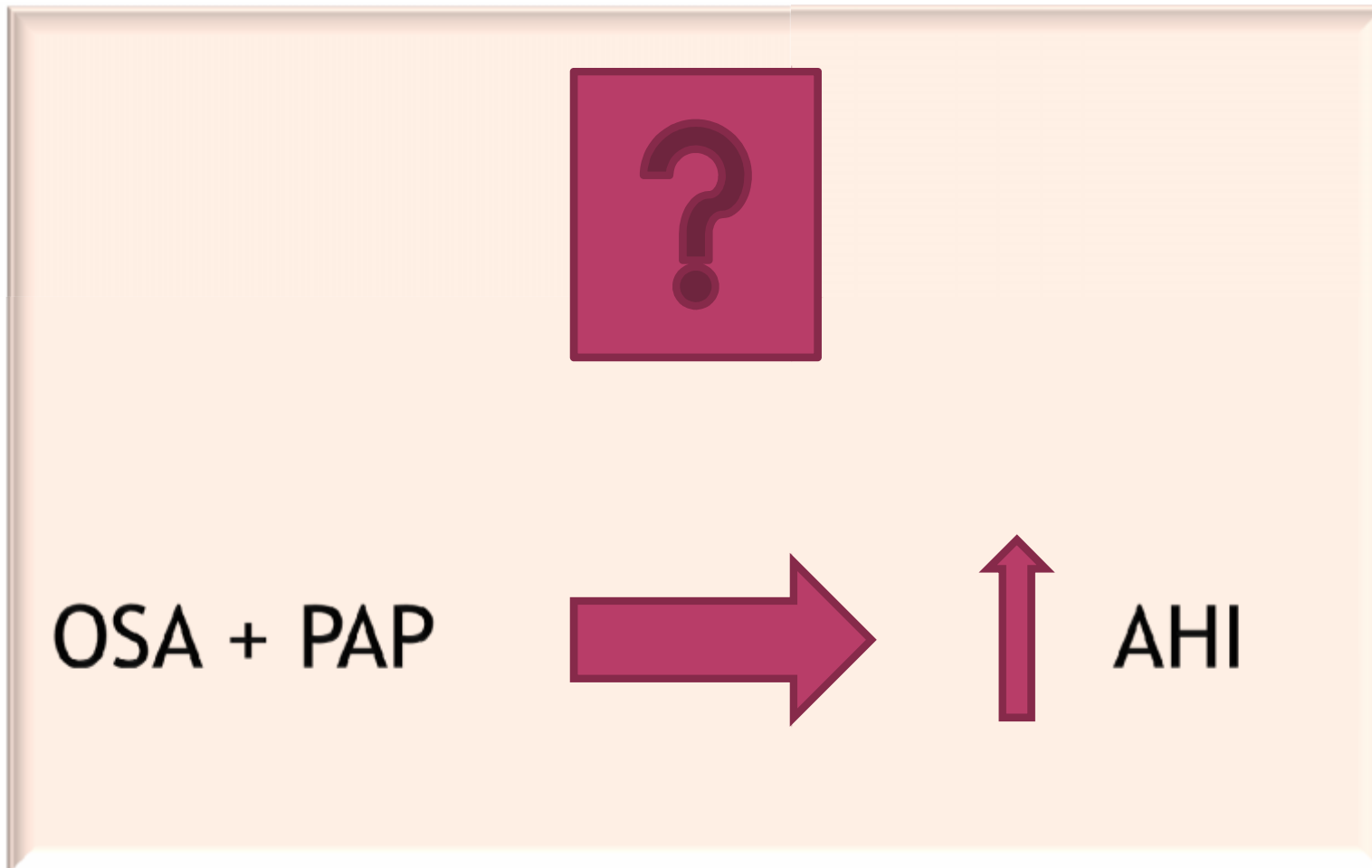
TREATMENT-EMERGENT CENTRAL SLEEP APNEA

Dr. ALAA ALKHALILI

PREVIOUSLY

Complex sleep apnea

WHAT WOULD YOU DO?



DEFINITION AND EPIDEMIOLOGY

- ◉ OSA+PAP(5-15%)
- ◉ Persistence or emergence of central apneas and hypopneas during titration of PAP without backup RR for OSA.

DIAGNOSIS

ICSD-3 criteria:

- ◉ Confirmed OSA(obstructive $AHI \geq 5/h$).
- ◉ Upon PAP titration without a backup RR:
 - Resolution of obstructive events,
 - $AHI \geq 5/h$,
 - Central apnea and hypopnea $\geq 50\%$ AHI,
 - Central $AHI \geq 5/h$,
 - CSA is not better explained by another CSA disorder.

RISK FACTORS

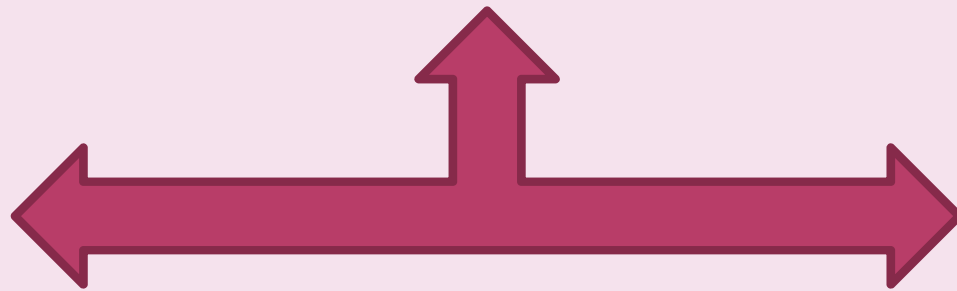
Male sex	Comorbid heart failure
Severe OSA	PSG: Mixture of obstructive and central apneas
Higher levels of CPAP (Overtitration)	Use of a high -PS
High altitude	Oral breathing
Opioid narcotics	Supine sleep position

TREATMENT

mode, and repeat
; later.

TREATMENT

If persistent CSA on CPAP



ASV
(preferable)

BPAP
with backup
RR

TREATMENT

e, continuing CPAP is
the treatment of OSA

WARNING

R may be harmful
t-emergent CSA.



you

good

sleep