

A satellite image of Europe at night, showing the continent's outline against the dark blue of the surrounding oceans. The landmasses are illuminated with a mix of green and brown, representing vegetation and terrain. The text is overlaid on the image in a yellow, outlined font.

MESH 2016

Chemical Components "Separation"  
in abdominal wall reconstruction

June 18. 2016  
Paris, France

Jan F. Kukleta, MD, FMCH  
Zurich, Switzerland

# Chemical Components Separation

Effect of BTA in order to increase the abdominal capacity prior to elective hernia repair

- The expression is wrong (incorrect)
- BTA does not separate components
- BTA induces a flaccid paralysis of injected oblique muscles
- BTA relaxes the muscle, flattens and stretches the retracted lateral abdominal wall

# Chemical Components Relaxation



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MESH 2016

Temporary  
Chemical Components Relaxation  
in abdominal wall reconstruction

June 18. 2016  
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It's not easy to deal with  
patients like these!

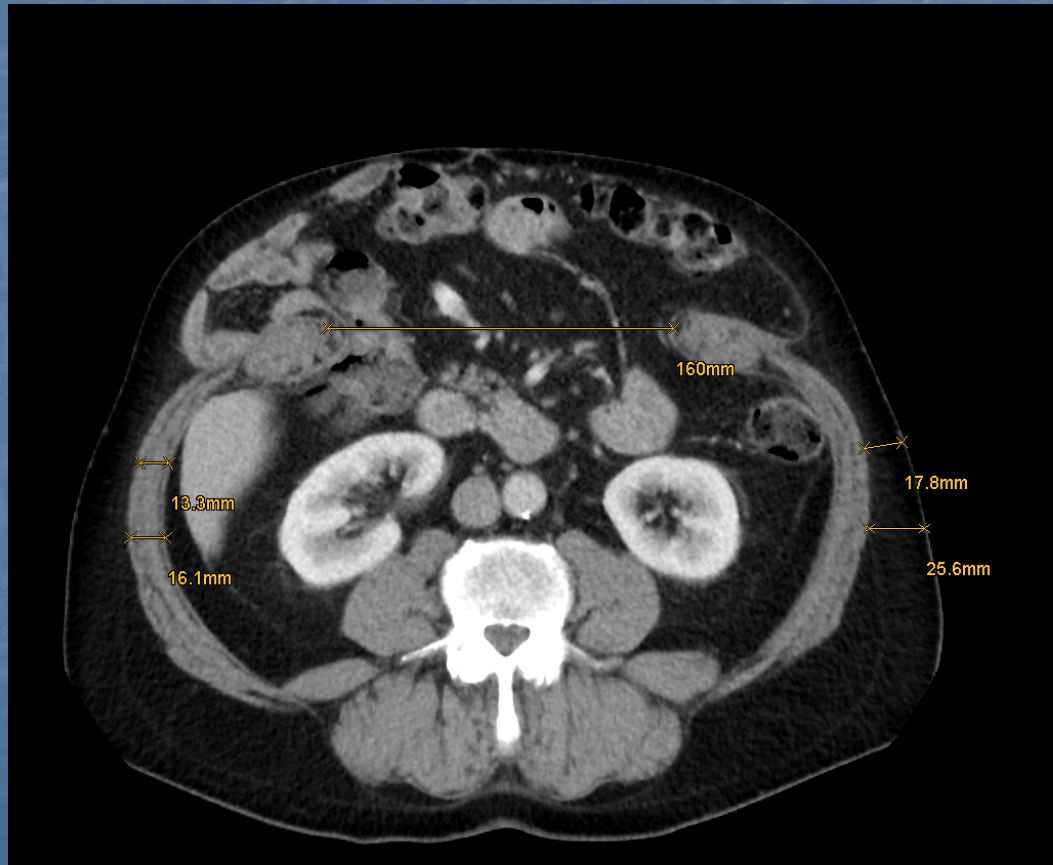




Or these !



Main problem:  
Large hernia, retracted muscles,  
loss of domain, time delay until repair





# Classical scenario



- Patients with complications
- Often survivals after disasters
- Trying to avoid next surgery
- The delay is understandable, but
- The hernia gets bigger
- Soft tissue condition may worsen
- The **disuse atrophy** of the lateral wall begins

# Large or giant incisional hernia

- Unloaded skeletal muscles undergo characteristic atrophic changes
- Change in fiber type composition
- Fibrosis
- Decrease muscle elasticity
- Stiffness
- DuBay DA, Franz MG et al. Incisional herniation induces decreased abdominal wall compliance via oblique muscle atrophy and fibrosis. Ann Surg. 2007 Jan;245(1):140-6.



# Strategy

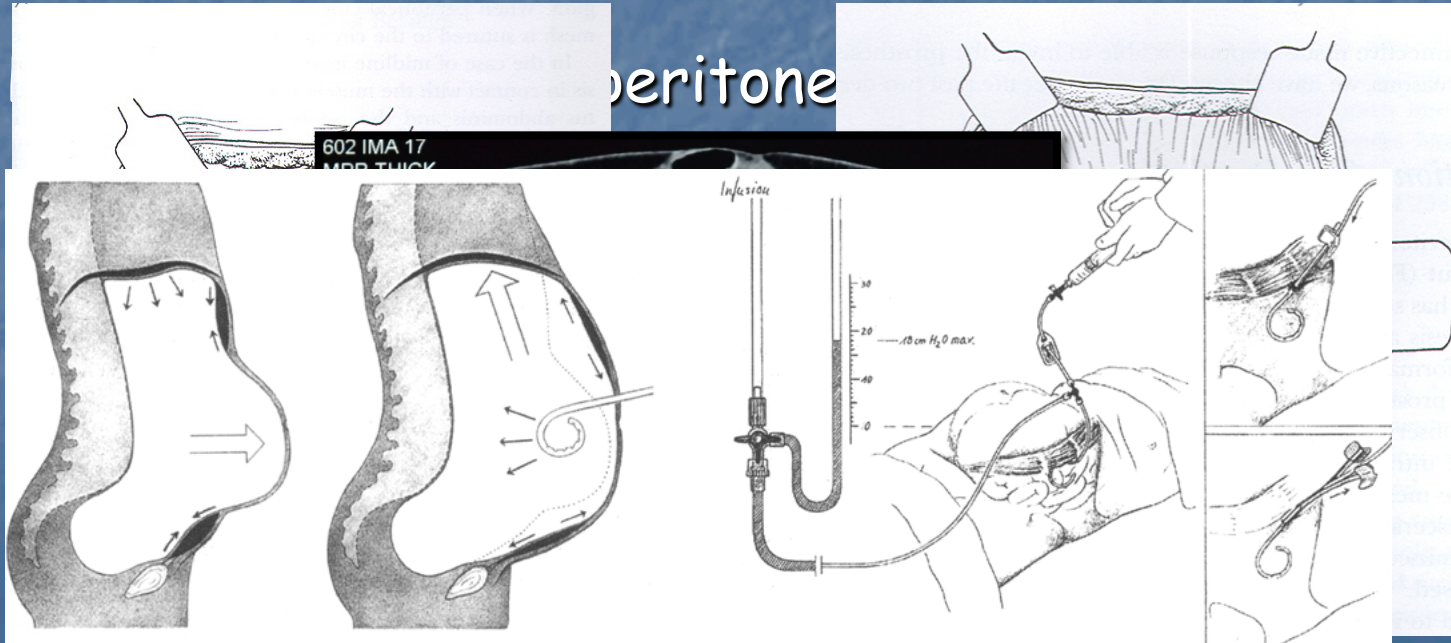
## How to reduce the tension?

.... and facilitate the closure

- Increase the abdominal capacity  
Stretch of the abdominal wall
- Reduction of abdominal content  
(omectomy, subtotal colectomy)
- Combination of both
- Bridging repair

# Stretch of the abdominal wall

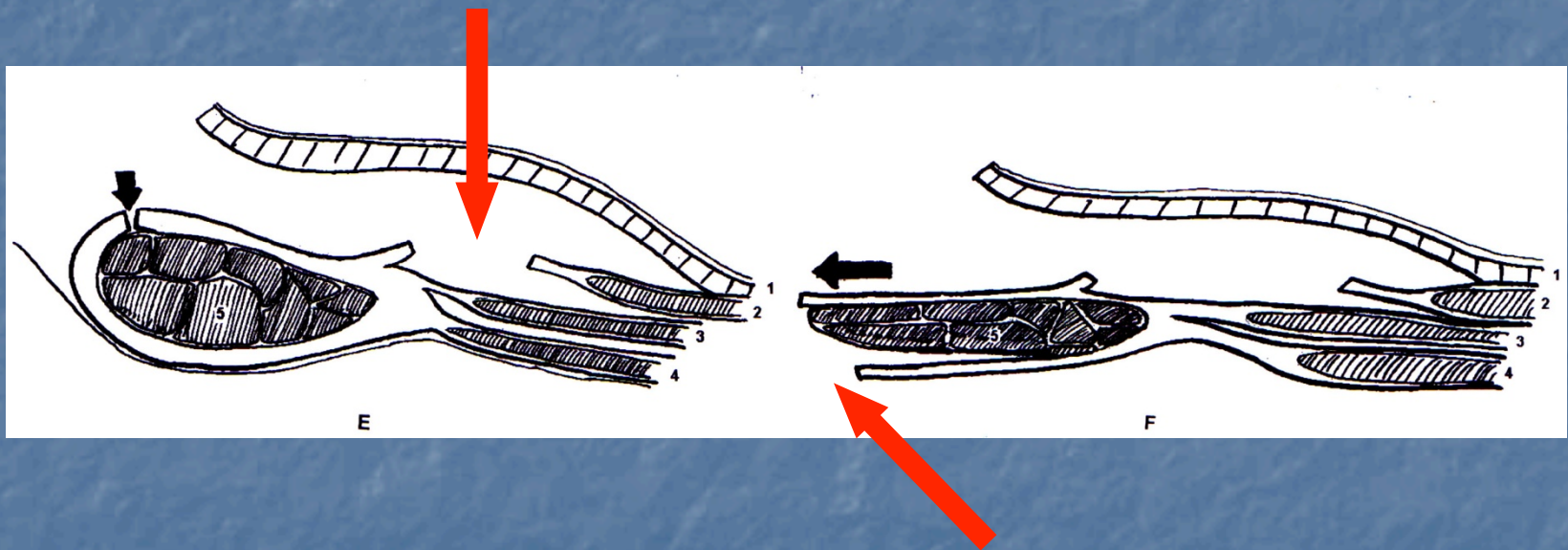
- Multiple relaxing incisions of anterior rectus sheath  
Clotteau-Premont
- Large relaxing incisions (Gibson's operation)
- Intermuscular tissue expanders (lateral abd. wall)





# Stretch of the abdominal wall

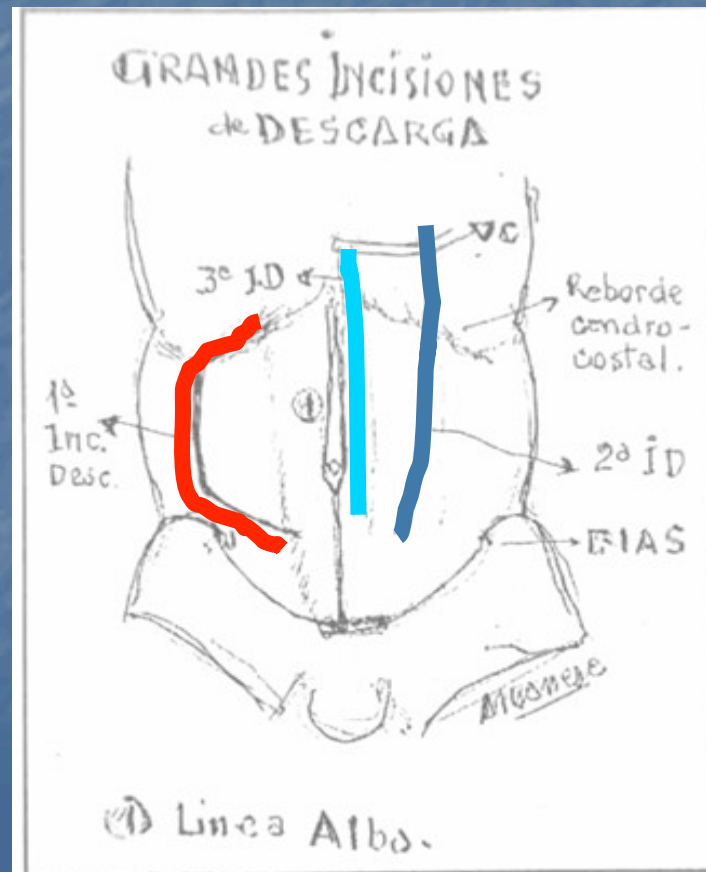
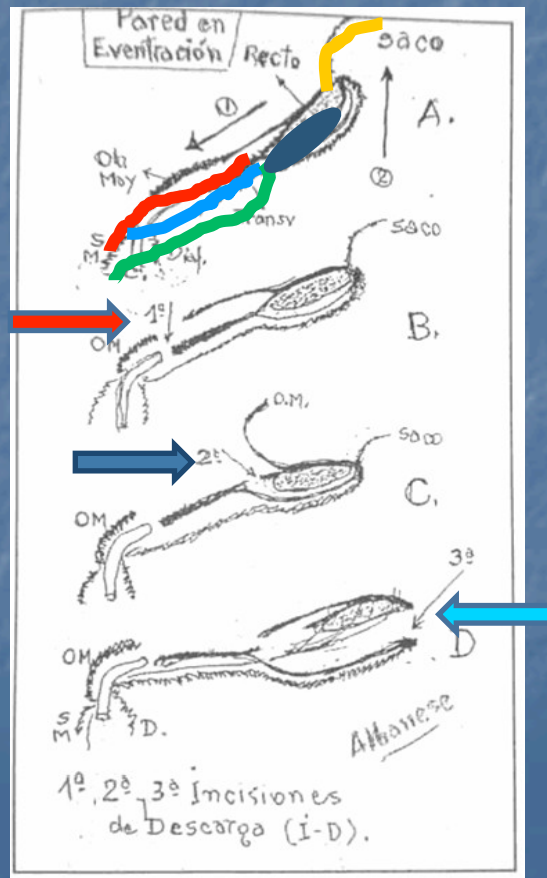
- Anterior components separation ( Ramirez 1990)



Ramirez OM, Ruas E, Dellon AL. Components separation method for closure of abdominal-wall defects: An anatomic and clinical study *Plast Reconstr Surg*. 1990 Sep;86(3):519-26

# Stretch of the abdominal wall

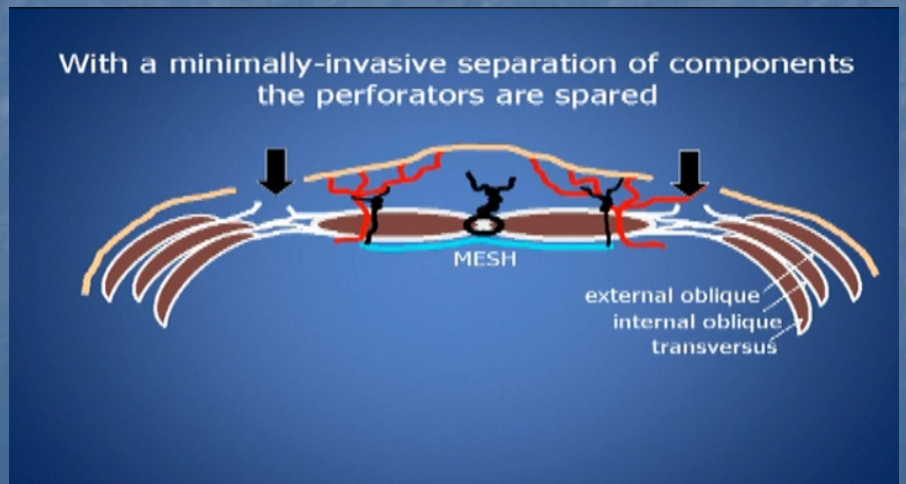
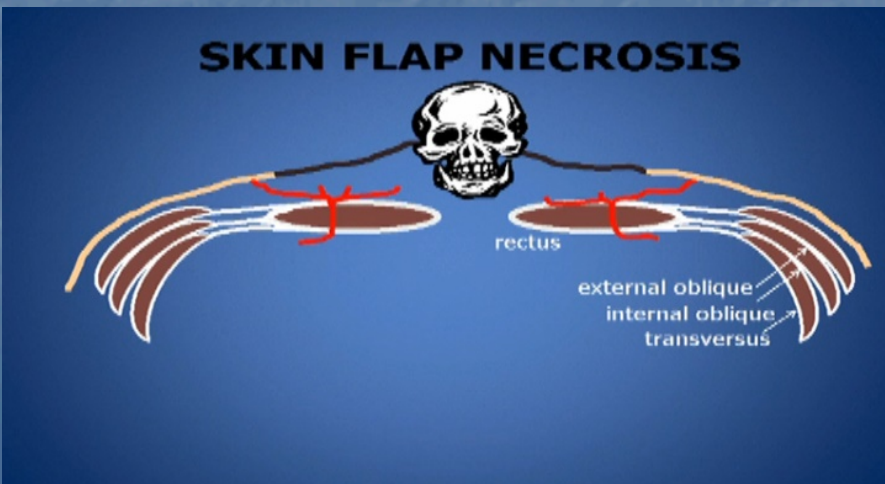
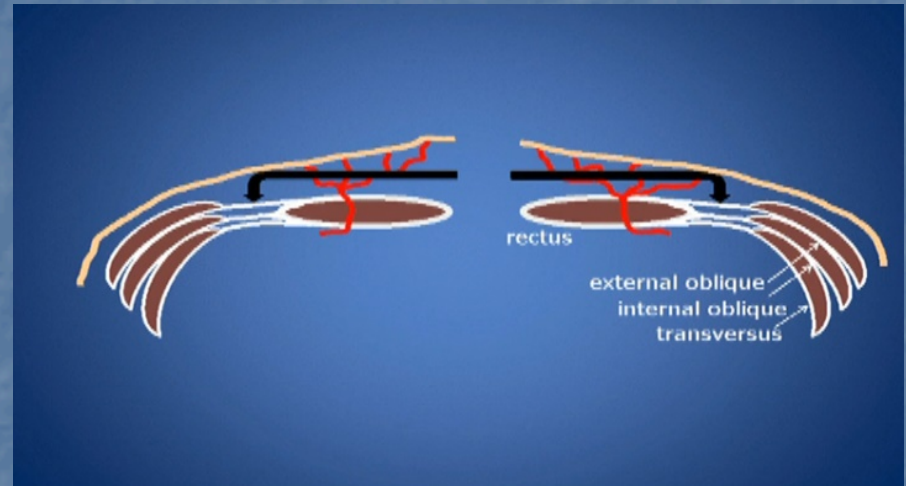
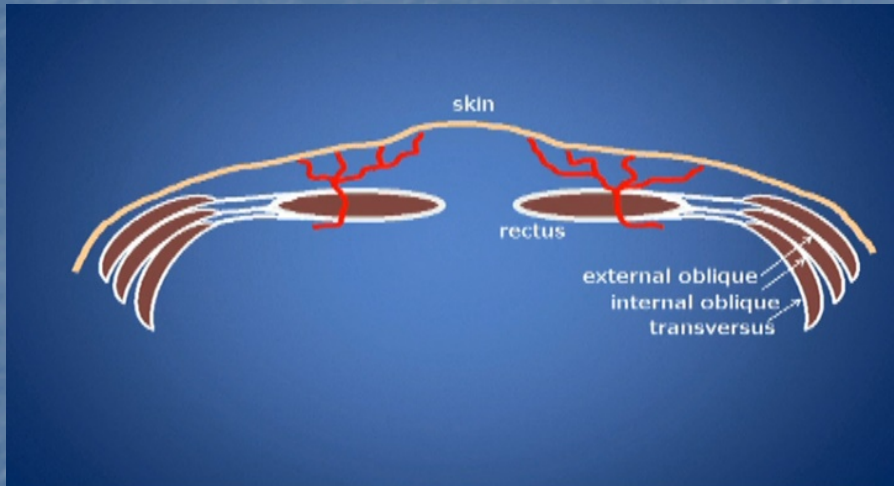
- Anterior components separation ( Ramirez 1990)
- Anterior CS Technique of Albanese (1946)





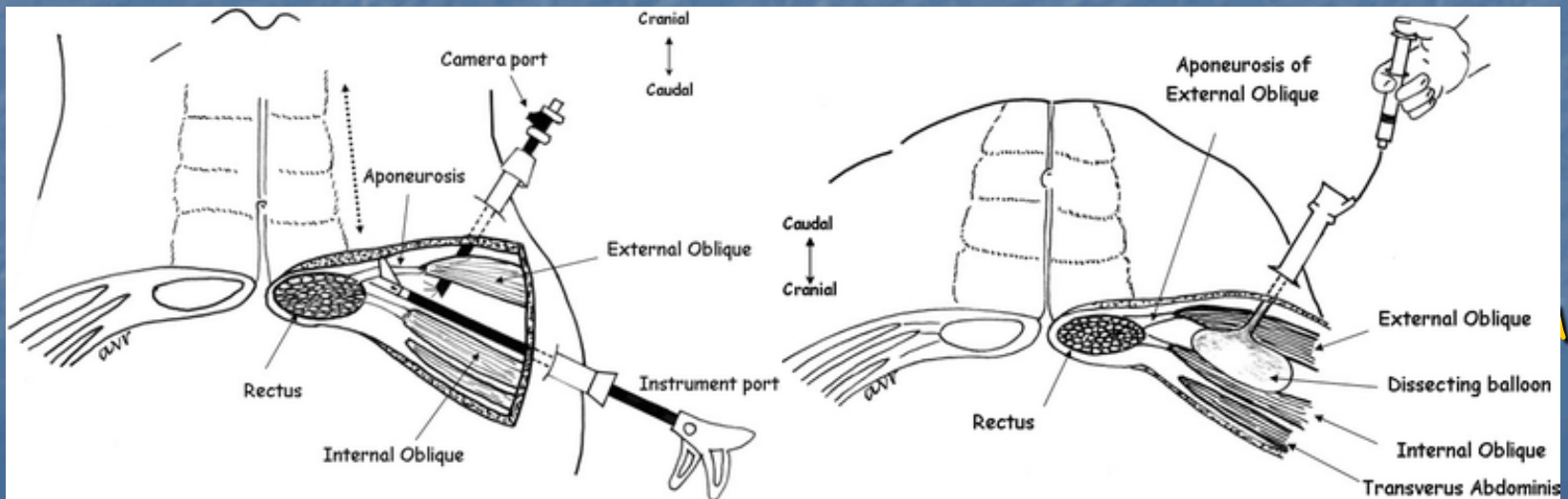
# Limitations of ACS

From Jonathan Carter, MD, UCSF, on Youtube



# Stretch of the abdominal wall

- Anterior components separation ( Ramirez 1990)
- Anterior CS Technique of Albanese (1946)
- Open components separation over linea semilunaris
- Lap assisted intermuscular approach (Rosen1, Rosen2)





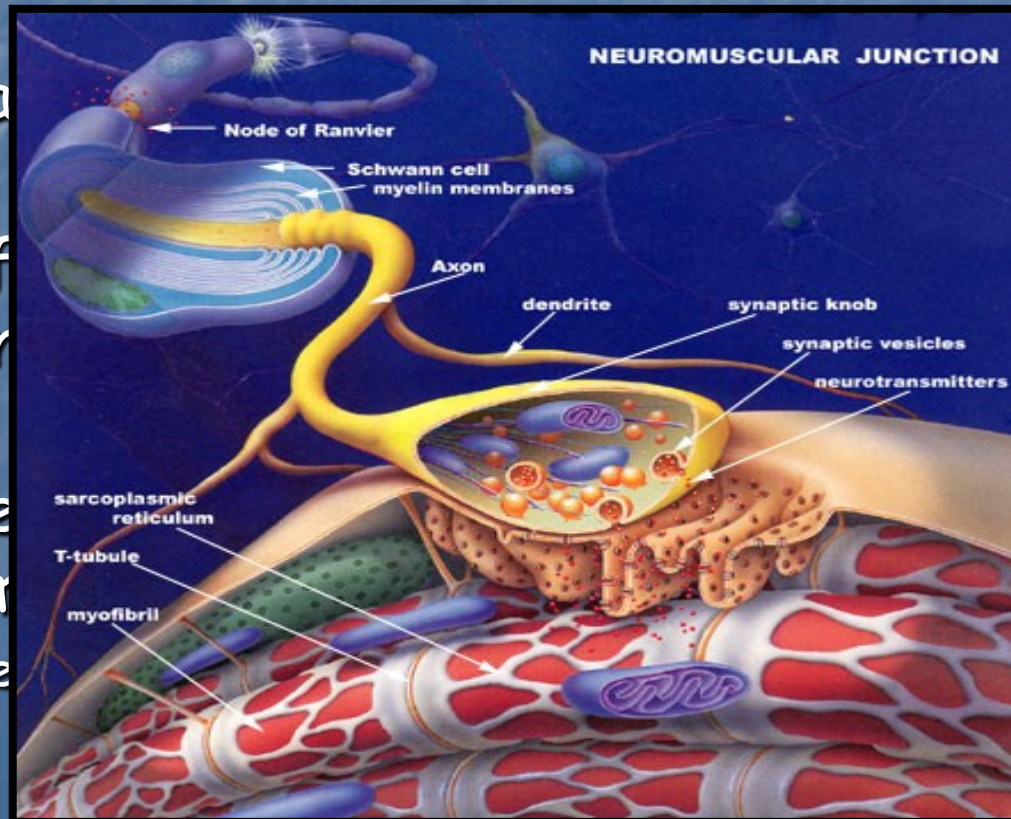
# The BTA story

- BTA blocks selectively acetylcholine-release at motor and vegetative nerve end-plate

• Chemical

• Begin of duration

• BTA pre in inflam  
"substance



sis

4 weeks

es involved

# Chemical Components Relaxation

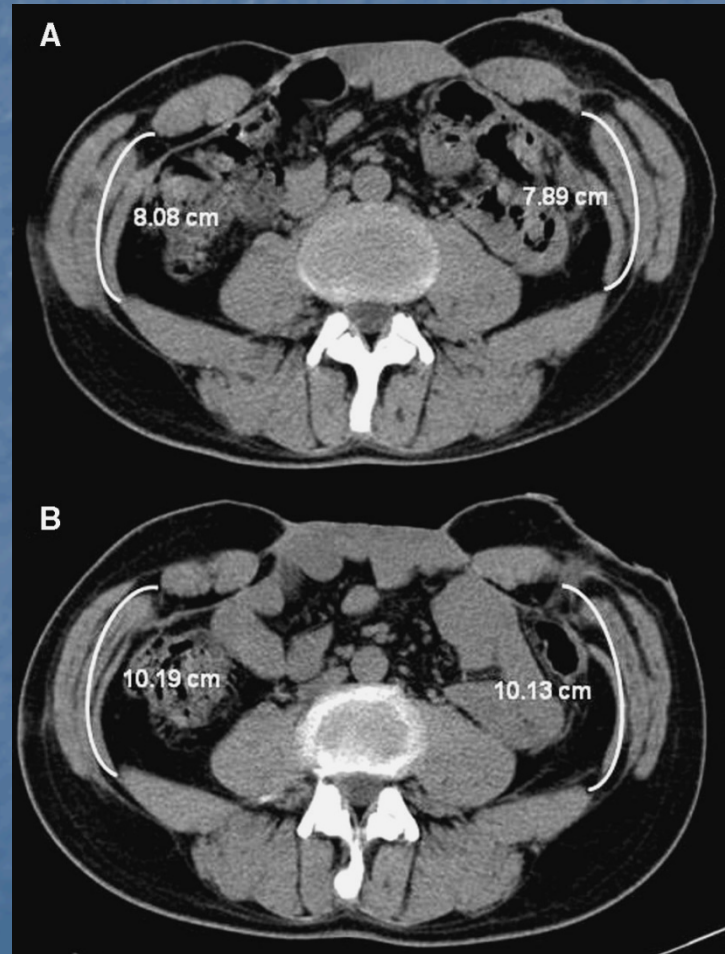
## What for?

- to enlarge the abdominal cavity by stretching and flattening of the retracted lateral wall in order to facilitate the abdominal wall reconstruction
- to lower the intraabdominal pressure at defect closure, decrease the risk of abdominal compartment syndrome.
- As a logical preoperative optimization of patients with loss of domain
- to extend the period of decreased tension in reconstructed area (better condition of healing)



# Elongation effect of BTA

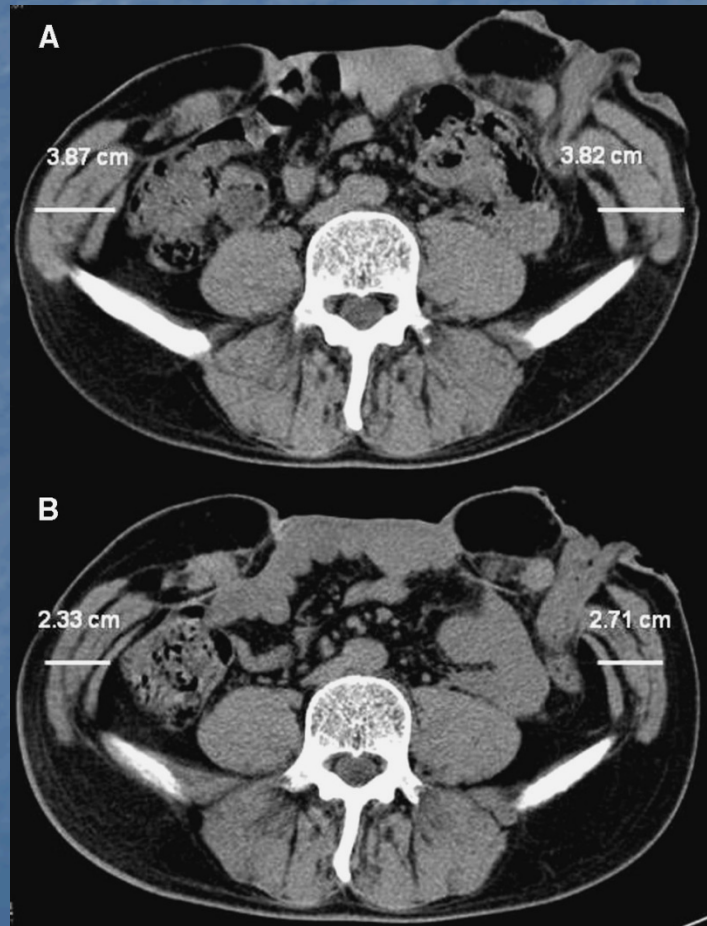
Pre BTA



Post BTA

# "Flattening or decontraction" of retracted muscles

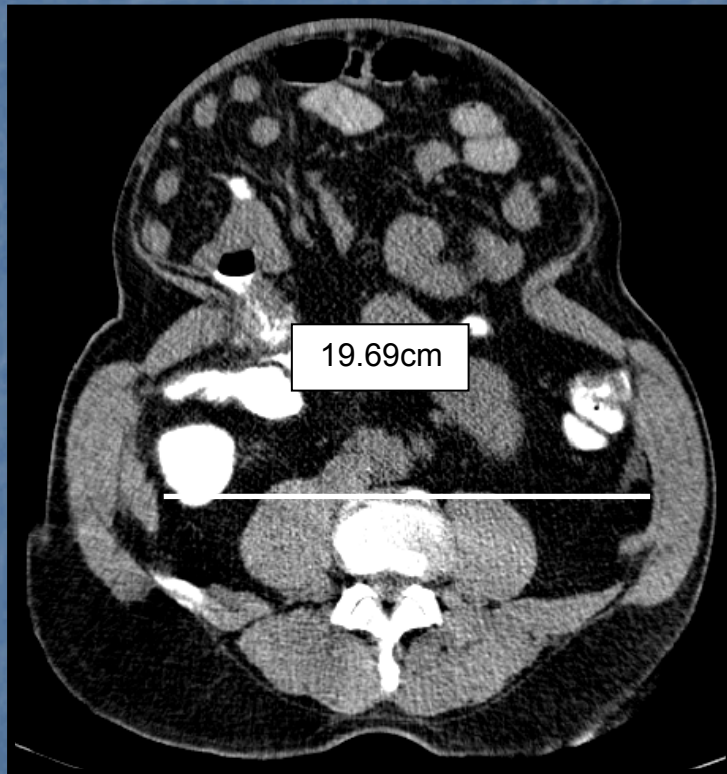
Pre BTA



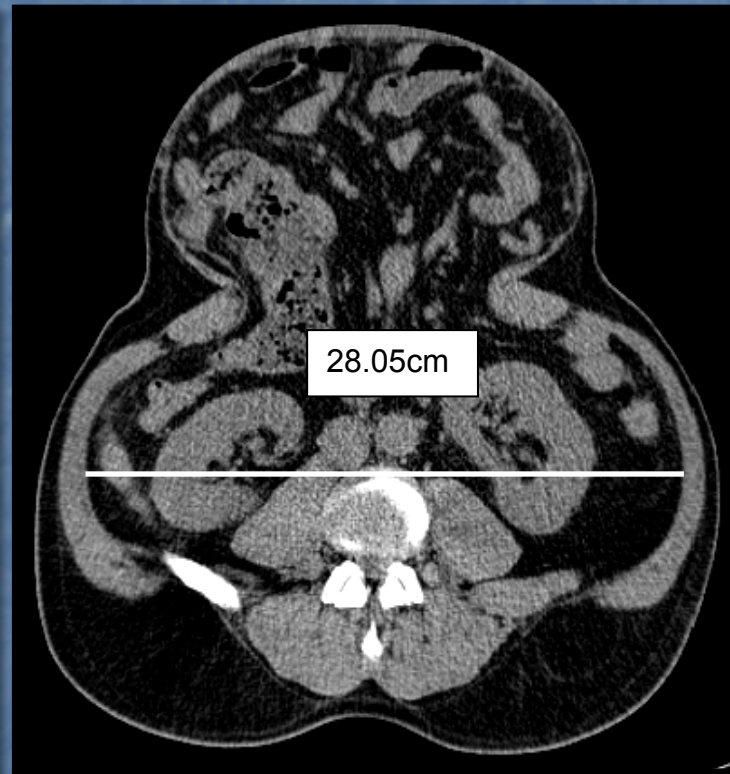
Post BTA



# Transverse diameter enlarges and hernia orifice gets smaller

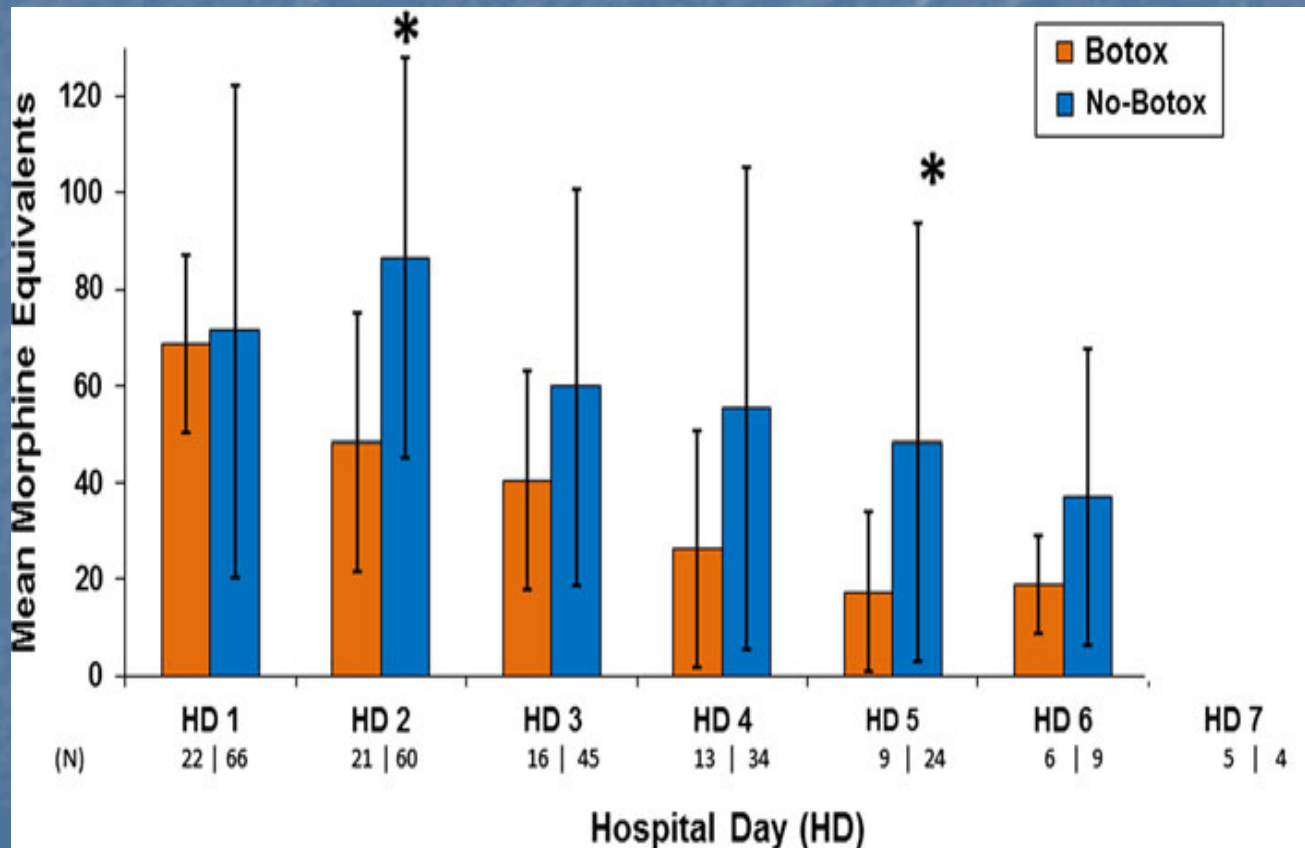


Pre BTA



Post BTA

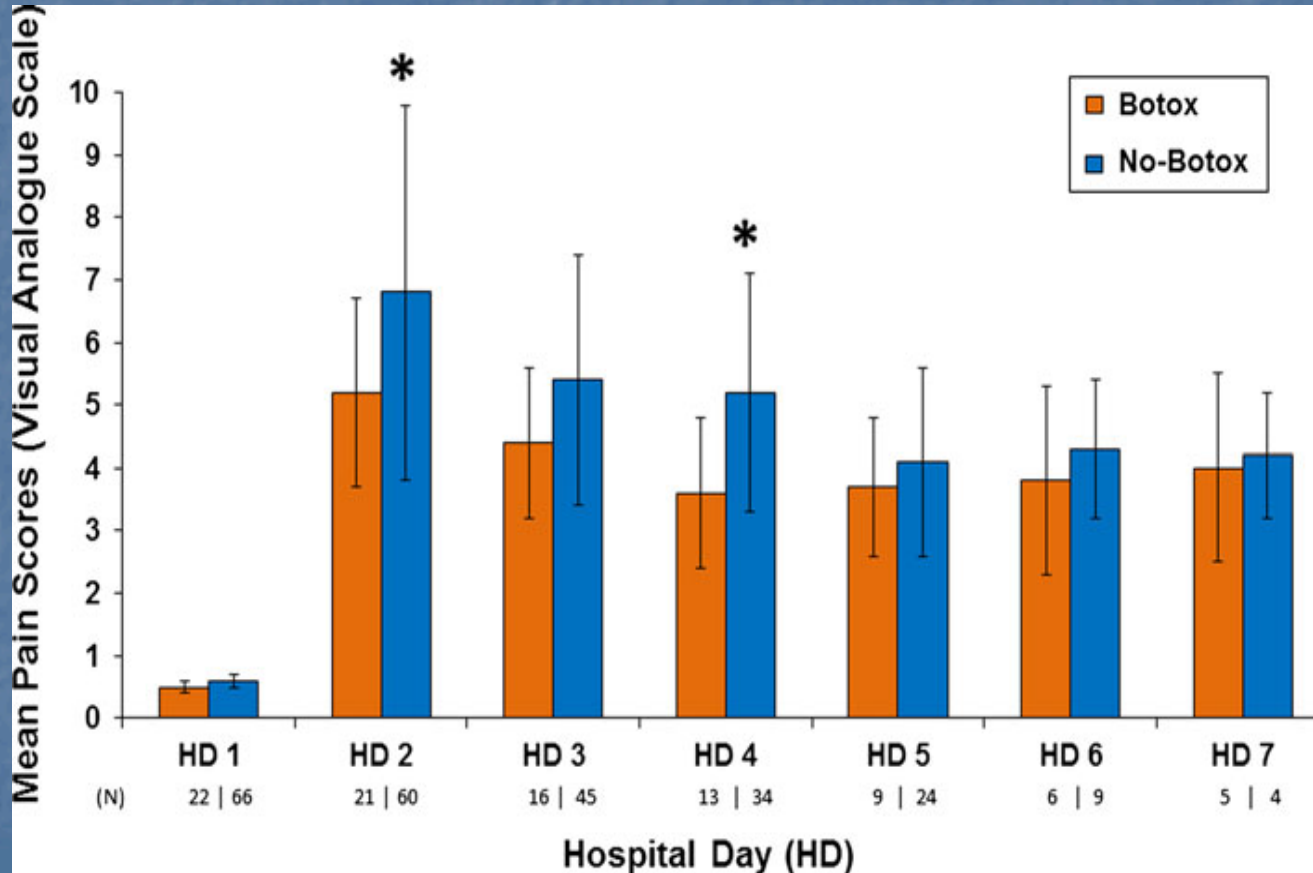
# Morphine-equivalents with and without Botox®



Zendejas B et al. World J Surg (2013) 37:2830-2837



# VAS with and without Botox®



Zendejas B et al. World J Surg (2013) 37:2830-2837

# Chemical Components Relaxation

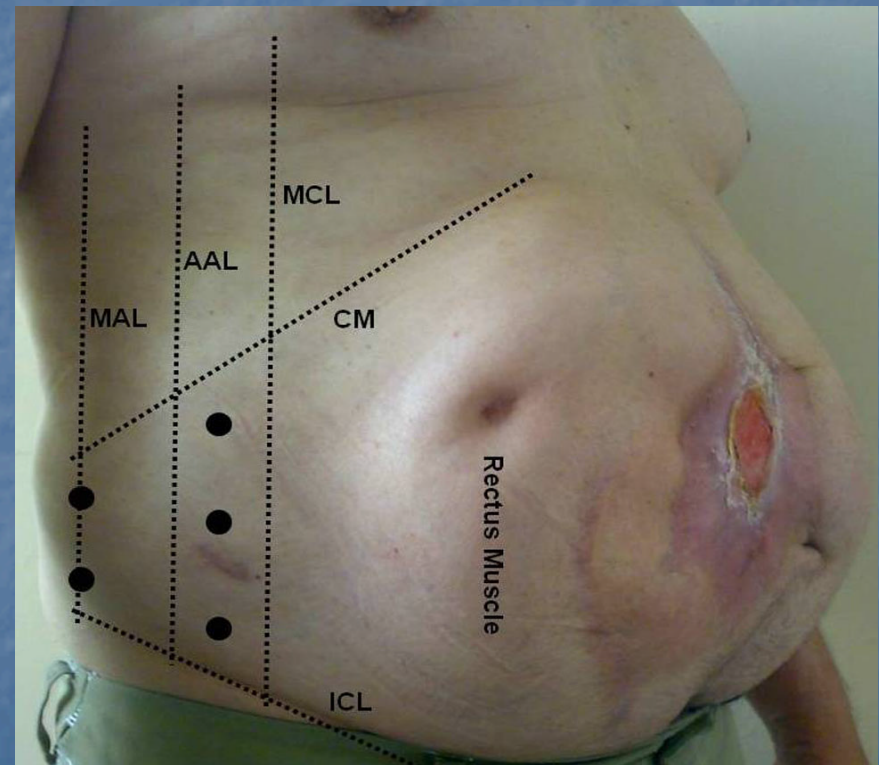
## HOW?

- Infiltration of the lateral abdominal wall with BTA
- Muscle mass-dependent dosage
- Approximately 100 U of Botox/ 300 U Dysport per side, distributed in 5 different localizations dorsally of anterior axillary line
- Eventually with preoperative progressive pneumoperitoneum and with intermuscular expanders implanted preoperatively

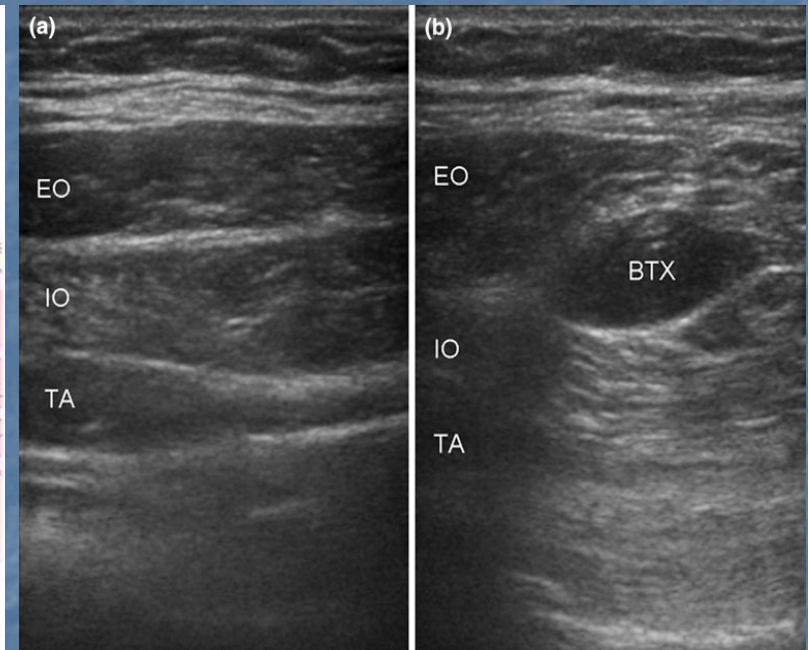
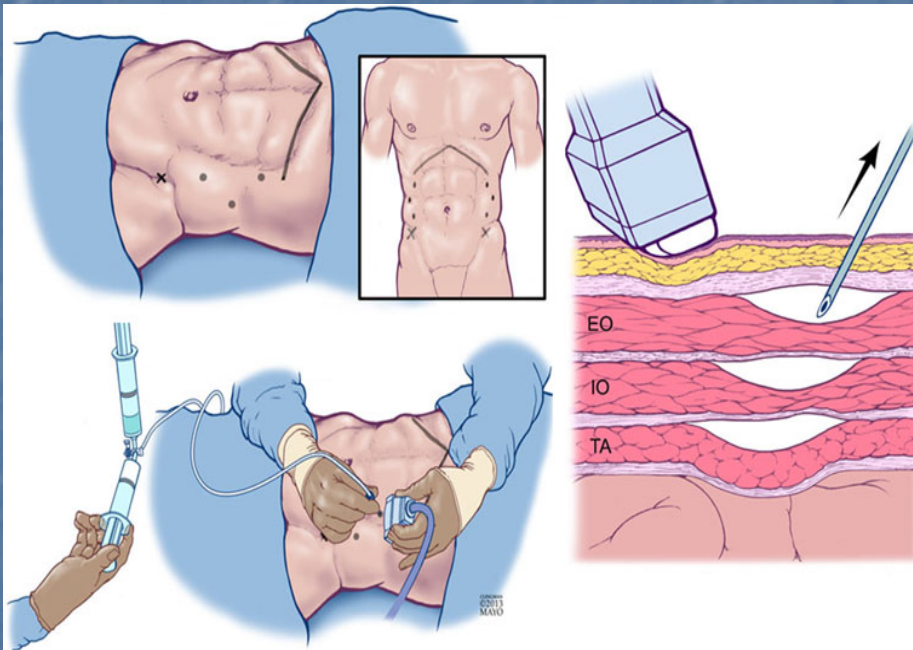


# Infiltration of the lateral abdominal wall with BTA

right flank, 20 E/ Position, in total 200 E



# Ultrasound-guided infiltration

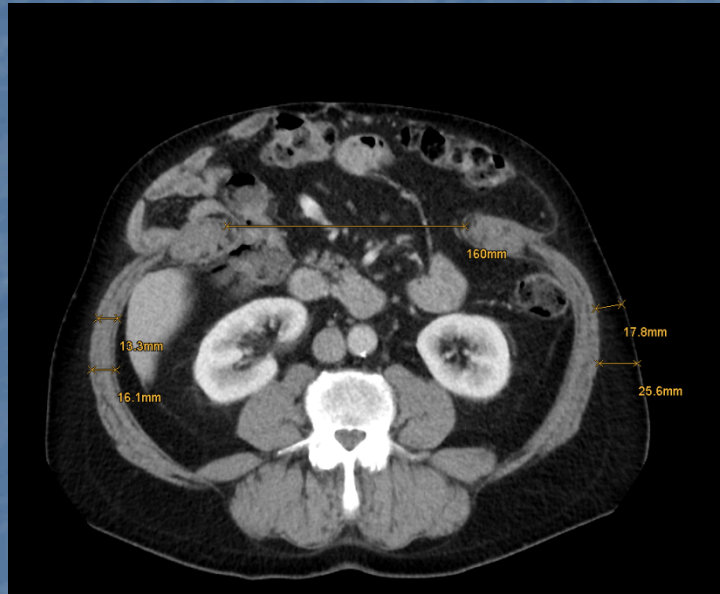




# Dr. Tomas Ibarra in his hometown Guadalajara, Mexico



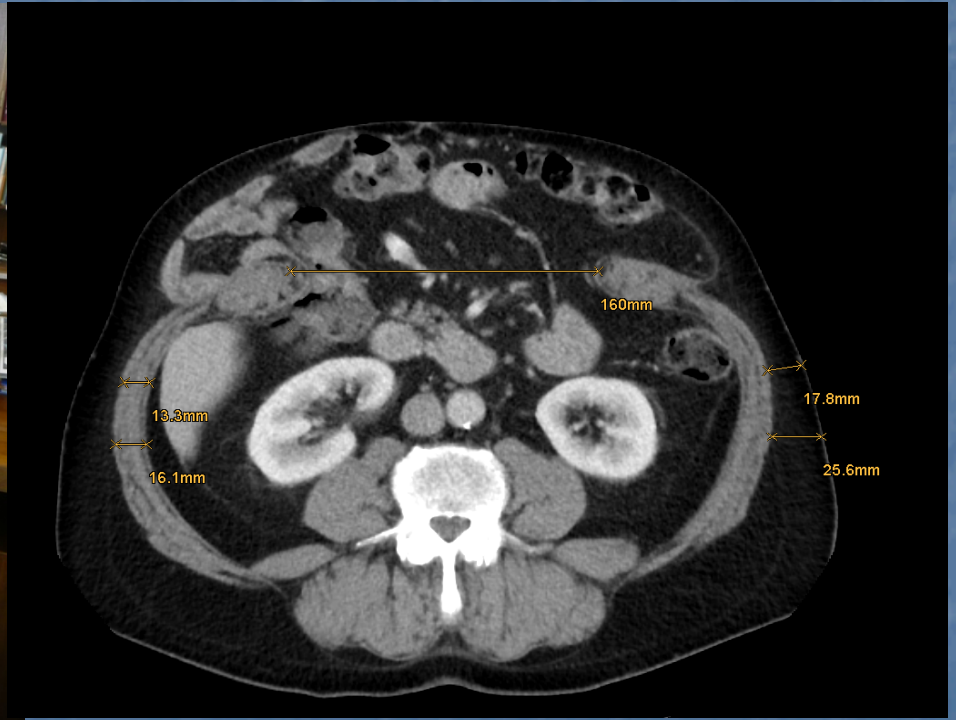
# Rigoberto Alvarez at work





# Starting point

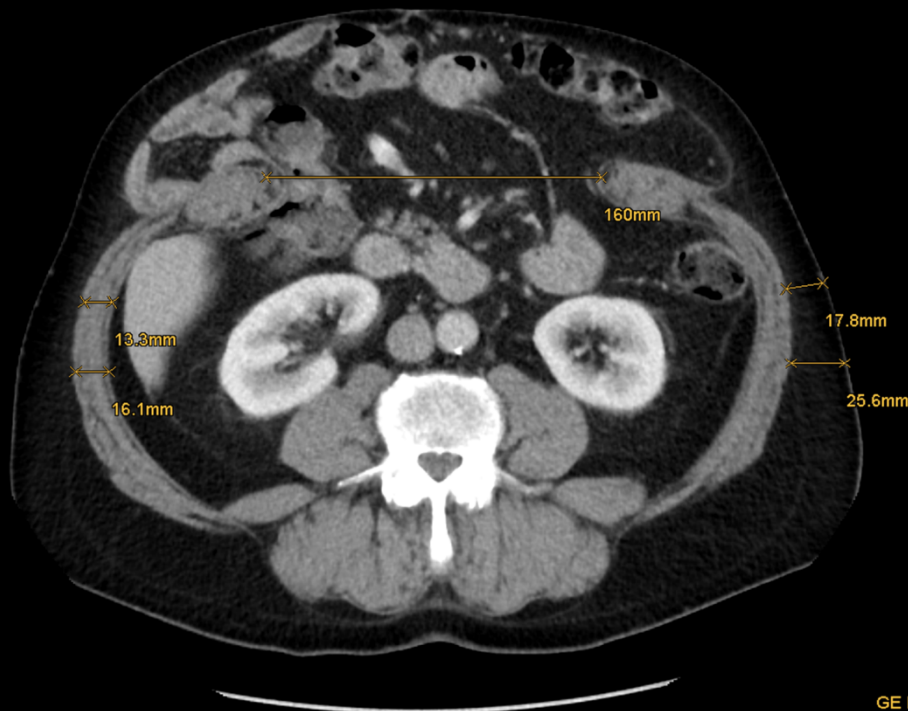
Waist circumference 132 cm



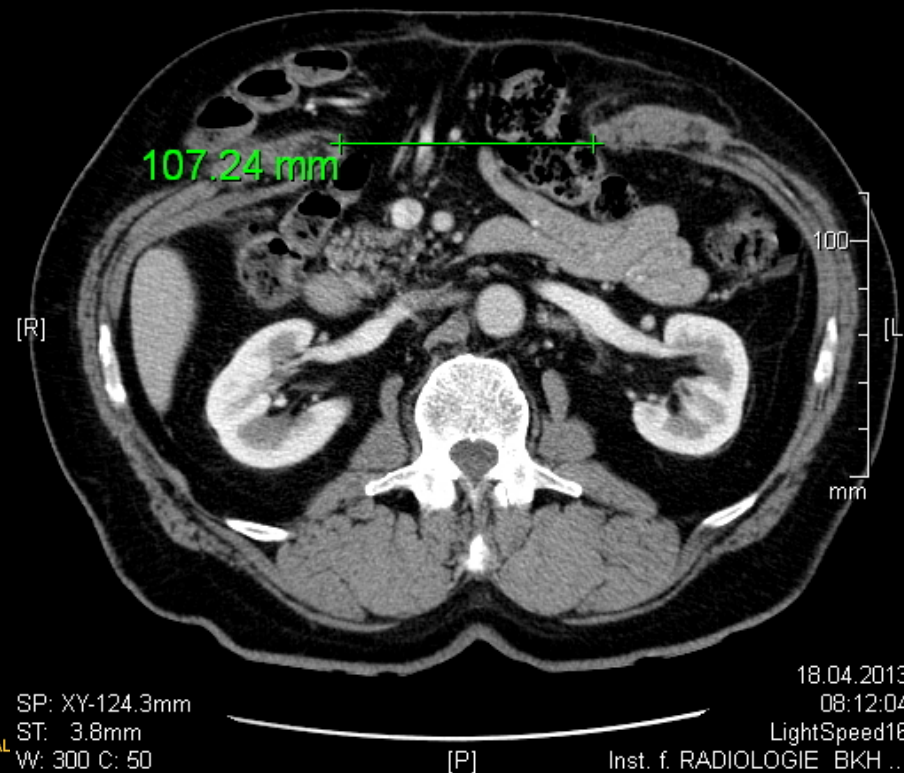
Sigmoid resection, Incisional hernia, Sublay, Recurrence,  
Lap IPOM, Fistulas, Mesh removal, ? CST ?

# Preoperative before and 4 weeks after Botox

A



[A]





4 Weeks Postop  
circumference 110 cm (= -22cm)





48 weeks postop -24cm





# What is more sustainable ?

Calculated permanent partial destruction  
of the abdominal wall?

vs.

Temporary reduction of the muscle tone  
with spontaneous restitution?

# Conclusion



- BTA has a strong potential to facilitate complex repairs.
- BTA with or without PPP enables primary closure and prevents definitive partial damage to the lateral abdominal wall (ACS and TAR)
- BTA decreases the postoperative pain perception in two different ways: directly through an unknown mechanism (within hours and days) and indirectly through reduction of muscular tension (4-6 months)



# Conclusion



- Use of BTA in abdominal wall repair is still an **off-label therapy**
- There is a “working group” on a way trying to put the available data together



A satellite image of Europe at night, showing the continent's outline against the dark blue of the surrounding oceans. The landmasses are illuminated with a mix of green and brown, representing vegetation and terrain. Numerous small, bright white and yellow dots are scattered across the land, representing city lights and urban areas. The text "Thank you for sharing your opinions with me" is overlaid in a white, sans-serif font, centered on the right side of the image.

Thank you for sharing  
your opinions with me

Jan F. Kukleta, MD, FMCH  
Zurich, Switzerland



# References 1

Ibarra-Hurtado TR, Nuno-Guzman CM, Echeagaray-Herrera JE, Robles-Velez ER, Gonzalez-Jaime JJ (2009) Use of botulinum toxin type A before abdominal wall hernia reconstruction. World J Surg 33:2553-2556

Zielinski MD, Goussous N, Schiller HJ et al (2013) Chemical component separation with botulinum toxin A: a novel technique to improve primary fascial closure rates of the open abdomen. Hernia 17:101-107

Smoot D, Zielinski M, Jenkins D, Schiller H. Botox A injection for pain after laparoscopic ventral hernia: a case report. Pain Med. 2011; 12: 1121-3.

# References 2

Farooque F, Jacombs ASW, Roussos E, Read JW, Dardano AN, Edye M, Ibrahim N (2016) . Preoperative abdominal muscle elongation with botulinum toxin A for complex incisional ventral hernia repair. ANZJSurg. doi: 10.1111/ans.13258

Ibarra-Hurtado TR, Nuño-Guzman CM , Miranda-Diaz AG, Troyo-Sanroman R, Navarro-Ibarra R, Bravo-Cuellar R. Effect of botulinum toxin type A in lateral abdominal wall muscles thickness and length of patients with midline incisional hernia secondary to open abdomen management. Hernia, DOI 10.1007/s10029-014-1280-2

Zendejas B, Khasawneh MA, Srvantstyan B, Jenkins DH, Schiller HJ, Zielinski MD. Outcomes of Chemical Component Paralysis Using Botulinum Toxin for Incisional Hernia Repairs. World J Surg (2013) 37:2830-2837

Rosin D. Outcomes of Chemical Component Paralysis Using Botulinum Toxin for Incisional Hernia Repairs. World J Surg (2013) 37:2838



# References 3

Elstner KE, Jacombs ASW, Read JW, Rodriguez O, Edye M, Cosman PH, Dardano AN, Zea A, Boesel T, Mikami DJ, Craft C, Ibrahim N (2016) Laparoscopic repair of complex ventral hernia facilitated by pre-operative chemical component relaxation using Botulinum Toxin A. *Hernia*, DOI: 10.1007/s10029-016-1478-6



Sharing knowledge and  
exchange of experience

Thank you for your attention



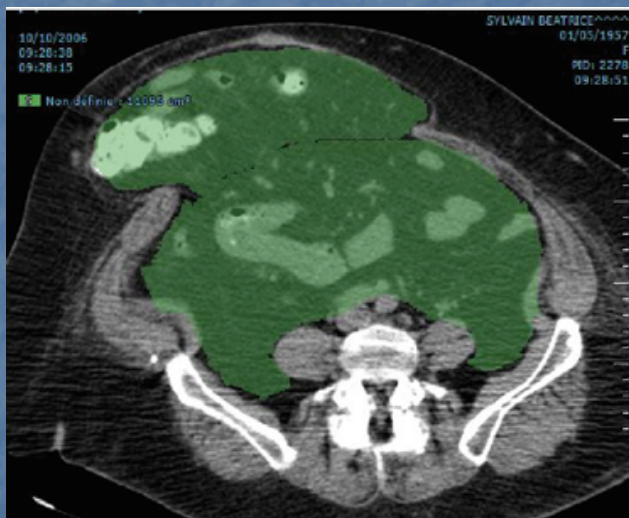
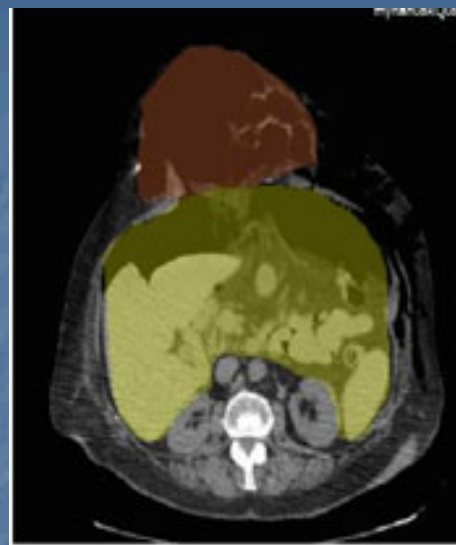
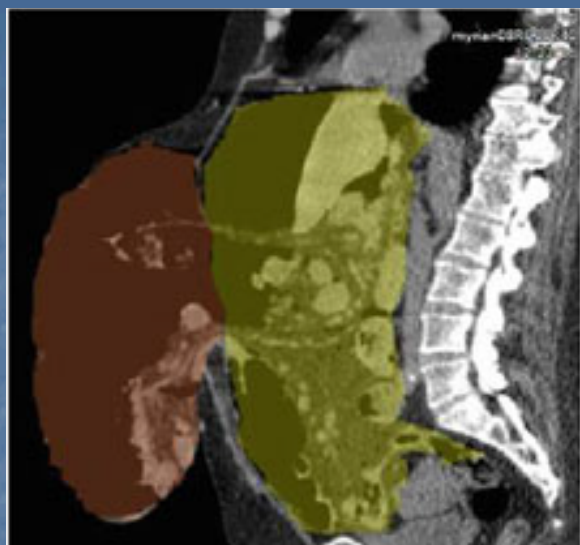


# Botulinustoxin A

- Azzalure® (Galderma)
- Bocouture® (Merz)
- Botox® (Pharm Allergan)
- Dysport® (Ipsen)
- Vistabel® (Pharm Allergan)
- Xeomin® (Merz)

Conversion ratio Botox® to Dysport®

1 : 3-4



Sabbagh C, Dumont F, Robert B, Badaoui R, Verhaeghe P, Regimbeau JM. Peritoneal volume is predictive of tension-free fascia closure of large incisional hernias with loss of domain: a prospective study. *Hernia* (2011) 15:559-565