

Embolia

Εν, in
Βάλλω, inserire

Embolismo fa riferimento
all'inserire

Le diapositive sono state realizzate dal prof. Ernesto Damiani

Esempi di embolismo

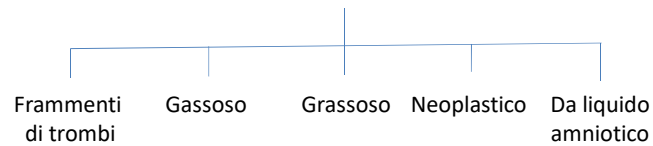
- Un calendario *lunisolare* è un calendario lunare, in cui la durata media dell'anno lunare è uguale a un anno solare. Per ottenere questa sincronizzazione ogni due o tre anni viene inserito un tredicesimo mese, detto **mese intercalare** o **mese embolismico**

Embolismo liturgico

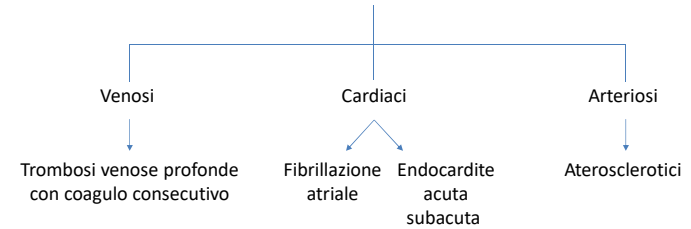
- La recitazione del Padre nostro nella messa comporta tre distinte sequenze rituali: a) L'invito alla preghiera; b) Il testo pregato insieme dal sacerdote e dai fedeli; c) l'**embolismo** «Liberaci, o Signore», preghiera sacerdotale.

Embolo

- Massa circolante
- Non miscibile con il sangue
- Di natura molteplice



1. Embolia da distacco di frammenti di trombi



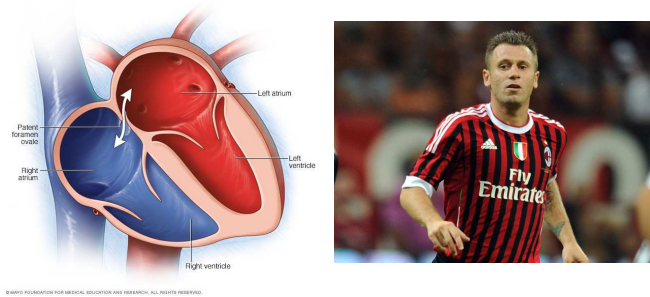
Destino degli emboli da distacco di frammenti di trombi venosi profondi

Arrivano al cuore destro

Gli emboli che partono dalle vene non possono dare embolia nel circolo sistemico a meno che...

Embolia paradossa

Embolia paradossa

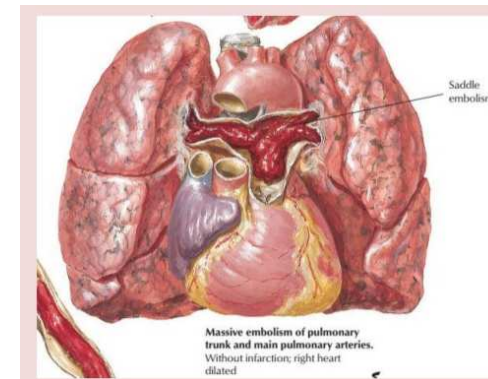


Retinal artery occlusion associated with a patent foramen ovale

- A healthy 17-year-old African-American male presented with **sudden, painless loss of vision in his right eye while playing basketball**. He denied associated symptoms of headache, pain, or visual disturbance, as well as **a history of sickle cell disease** or trait, or recreational drug abuse. Fluorescein angiography was consistent with a **Retinal Artery Occlusion**. The haematological/infectious work-up, including transthoracic echocardiogram (TTE), was negative. However, a trans-oesophageal echocardiogram (TEE) showed a **Patent Foramen Ovale**. The patient underwent a successful percutaneous femoral catheterization to close the defect.

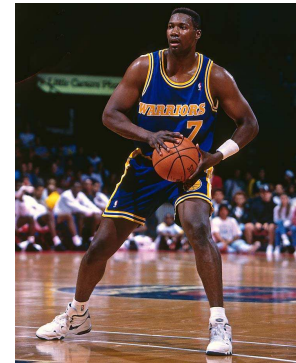
L'embolo supera la tricuspide

Embolia a sella



L'embolia a sella è causa di morte improvvisa

Jerome Kersey

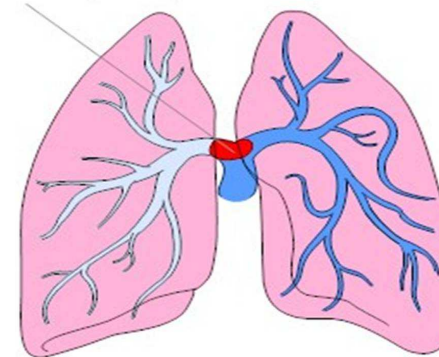


- Jerome Kersey died from **blood clot that traveled from his left calf to his lungs and caused a pulmonary thromboembolism.**
- Lewman said Kersey's death could be a complication from **knee surgery** the retired NBA player had late last week to repair a **torn meniscus** in his left knee.

L'embolo prende una arteria polmonare

Embolia polmonare acuta massiva

Pulmonary embolism in main pulmonary artery



Serena Williams

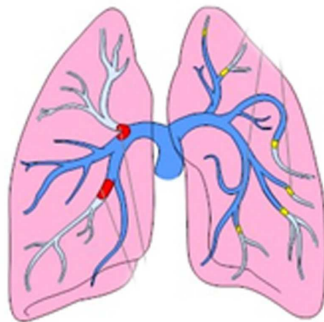
- Tennis star Serena Williams is at home resting after an "emergency treatment" Monday, days after doctors discovered a **blood clot in her lungs**.
- Williams had **surgery** after initially hurting her foot. She needed an **additional surgery** in October.



Dal punto di vista respiratorio, in queste situazioni c'è un'alterazione del rapporto ventilazione/perfusione.

Ci sono alveoli ventilati ma non perfusi

Gli emboli prendono le ramificazioni più piccole



- Può passare asintomatica
- Infarto

L'infarto polmonare è poco frequente

Richiede condizioni favorevoli

Il polmone è l'unico organo in cui si può avere ischemia senza ipossia

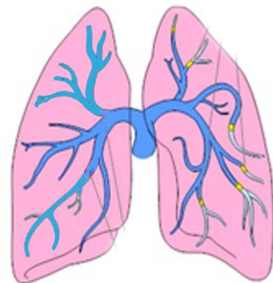
Il polmone si ossigena direttamente dall'aria alveolare

Ha una doppia circolazione

C'è un'ampia anastomosi a livello capillare

Tromboembolismo cronico

- Episodi ricorrenti di piccole embolie di natura trombotica



Soggetti a rischio

- Persone con insufficienza cardiaca
- Stenosi mitralica



Iperensione da tromboembolismo cronico (chronic thromboembolic pulmonary hypertension)

Pressione arteriosa polmonare >25 mm Hg
10% dei soggetti con una storia di ripetuti episodi di embolismo

12 marzo 2011, Pape Sow



- Il Caja Laboral ha annunciato che il centro Pape Sow è stato ricoverato in ospedale a causa di un'embolia polmonare e sicuramente sarà costretto a saltare il resto della stagione.

25 agosto 2012, Marijonas Petravičius



"Dopo quell'embolia polmonare, mi sono sottoposto a continui controlli e nell'ultimo periodo i medici mi hanno detto che se avessi continuato a giocare, avrei messo a rischio la mia vita, perché sarei potuto incorrere in gravi complicazioni

21 gennaio 2013, Anderson Varejao

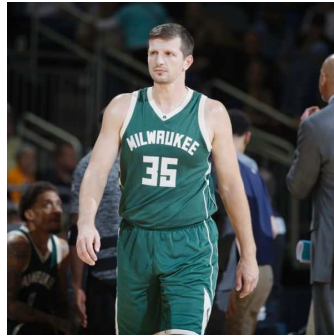


- Varejao was determined to be out for the season after developing a **pulmonary embolism** (or blood clot) in his lung. This is thought to be a **complication after surgery** to repair a strained quadriceps muscle.

25 marzo 2013, Pete Mickeal



- El blaugrana Pete Mickeal es perdrà el que queda de temporada per una **tromboembòlia pulmonar**
- El jugador del Barça Regal ja va tenir aquesta mateixa malaltia al mateix pulmó ara fa dos anys



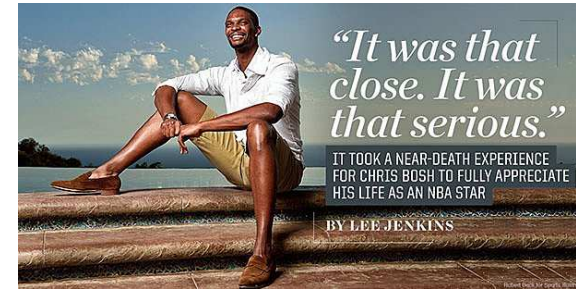
23 gennaio 2015
Nets' Mirza Teletovic Is Sidelined for Season by Blood Clots

14 dicembre 2017
Milwaukee Bucks' Mirza Teletovic out with pulmonary emboli in both lungs

28 febbraio 2018

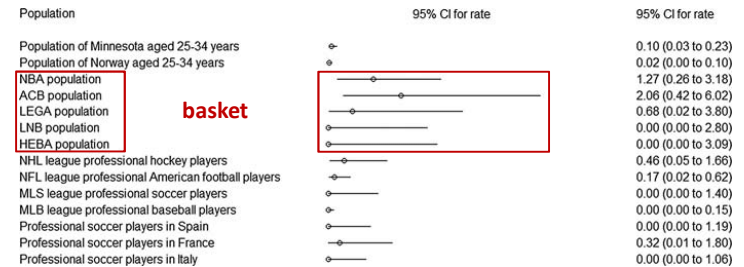
The Bucks announced Dec. 15 that forward Mirza Teletovic would be sidelined indefinitely by pulmonary emboli, an occurrence of blood clots in each of his lungs.

20 febbraio 2015, Chris Bosh



Do Basketball Players Have a High Risk of Pulmonary Embolism? A Scoping Review

Casals M, Martínez JA, Caylà JA, Martín V. *Med Sci Sports Exerc.* 2016 Mar;48(3):466-71



Original Article

Body Height and Incident Risk of Venous Thromboembolism A Cosibling Design

Bengt Zöller, MD, PhD; Jianguang Ji, MD, PhD; Jan Sundquist, MD, PhD;
Kristina Sundquist, MD, PhD

Background—Body height has been associated with an increased risk of venous thromboembolism (VTE), but the association can be confounded with shared familial factors (genetic/environmental). A cosibling design is useful for deeper understanding about the relationship between VTE and height.

Methods and Results—From Swedish national registry databases, we used a correlative design with full siblings alongside a general Swedish population sample. A cohort of male conscripts (n=1 610 870), born in 1951 to 1992 without previous VTE, was followed from enlistment (1969–2010) until 2012. Another cohort of first-time pregnant women (n=1 093 342) from the medical birth register, without previous VTE, was followed from first pregnancy (1982–2012) until 2012. Using the Multi-Generation Register, we identified all full-sibling pairs discordant for height. This cosibling design allowed for adjustment for familial factors (genetic/environmental). Compared with the tallest women (>185 cm) and men (>190 cm), there was a graded decreased risk by lower height for both men and women. The risk was lowest in women and men with the shortest stature (<155 and <160 cm, respectively); hazard ratios=0.31 (95% confidence interval, 0.22–0.42) and 0.35 (95% confidence interval, 0.22–0.55), respectively. There was a graded association also in the cosibling design comparing siblings with varying degree of discordance for height (reference was the taller sibling): ≥10 cm difference between brothers hazard ratios=0.69 (95% confidence interval, 0.61–0.78) and sisters hazard ratios=0.65 (95% confidence interval, 0.52–0.80), respectively.

Conclusions—Height is an independent predictor of VTE. The use of sibling pairs reduces the likelihood that familial confounding explains the results. The findings are important for the understanding of the pathogenesis of VTE. (*Circ Cardiovasc Genet.* 2017;10:e001651. DOI: 10.1161/CIRCGENETICS.116.001651.)

Greater height and long legs have been associated with an increased risk of incident venous thromboembolism (VTE), but results are divergent.^{1–9} One study by Schmidt et al¹⁰ found no association between VTE and height. Moreover, Brackkan et al⁸ found an association between height and VTE only among men and not among women. Similarly, Flinterman et al⁹ found only weak nonsignificant associations between height and VTE for women. This might be related to the fact that men are taller than women in general. An association between recurrent VTE and height has also been observed.^{8,11}

Still, a plausible explanation exists for an association between great height and increased VTE risk. Tall people and those with long legs may be subject to greater stasis in the legs as a consequence of greater hydrostatic pressure.^{12–14}

See Editorial by Schooling See Clinical Perspective

Height is highly heritable.¹⁵ Thus, genetic variants could be related to an increased VTE incidence. However, the common genetic variants related to height are individually only weakly

associated with height although they together explain a large part of the heritability of height.¹⁶ A genetic risk score of 696 variants, however, could be worthwhile to determine whether it is associated with VTE.¹⁷ In a modern Western society, 20% of the variation in body height is because of environmental causes.¹⁸ In poorer societies, the influence of the environment might be even stronger. Important nongenetic factors affecting growth and adult body height are nutrition, diseases, socioeconomic status, and environmental factors in childhood.^{18–20}

Observational studies have shown an association between body height and VTE,^{1–9} but concerns remain about confounding variables. In the current study, we used a cosibling design.^{21–24} Traditionally, in this approach, the association between an exposure and an outcome is compared in the general population and in full siblings. From the pattern of the associations in these 2 groups, it is possible to assess the degree to which the association observed in the population might be causal versus because of confounding from familial factors (genetic/environmental).^{21–24} The use of sibling pair analysis reduces the influence of familial confounding. If

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From the Center for Primary Health Care Research, Lund University, Malmö, Sweden.

The Data Supplement is available at <http://circgenetics.ahajournals.org/lookup/suppl/doi:10.1161/CIRCGENETICS.116.001651/-DC1>.

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Circ Cardiovasc Genet is available at <http://circgenetics.ahajournals.org>

DOI: 10.1161/CIRCGENETICS.116.001651

The higher incidence among men appeared to be mediated by body height

Ruolo del traumatismo?

Sindrome di Paget-Schroetter

Trombosi da sforzo (effort thrombosis)

Effort Thrombosis Presenting as Pulmonary Embolism in a Professional Baseball Pitcher

Brandon D. Bushnell, MD,*¶ Adam W. Anz, MD,‡ Keith Dugger, ATC,§ Gary A. Sakryd, MS, ATC, PAC,† and Thomas J. Noonan, MD†

Sports Health 1, 493-499

Rock climbing-related subclavian vein thrombosis

Christoph Lutter, Erik Monasterio, and Volker Schöffl

BMJ Case Rep. 2015; 2015: published online 2015 Oct 1. doi: [10.1136/bcr-2015-212021]

Deep Vein Thrombosis of the Subclavian Vein in a College Volleyball Player

Sidney Dane Treat,*† MD, Patrick A. Smith,‡ MD, Dennis Y. Wen,§ MD, and James J. Kinderknecht,¶ MD
From ¹Olmsted Medical Center, Rochester, Minnesota, ²Columbia Orthopedic Group, Columbia, Missouri, and ³University of Missouri-Columbia, Columbia, Missouri

Keywords: Paget-Schroetter syndrome; deep vein thrombosis; DVT; athletes; blood vessels; blood clot

Paget-Schroetter syndrome (PSS) refers to axillosubclavian deep vein thrombosis (DVT) without secondary cause. It is frequently referred to as effort-induced thrombosis and is exclusive of DVT cases with clear causes such as postsurgical immobilization, smoking, polycythemia, and cancer. PSS is most common in 10- to 35-year-olds, has been reported more frequently in men, and usually occurs in the dominant upper extremity.¹³ The syndrome often occurs following an activity involving repetitive abduction and external rotation of the involved extremity, such as throwing or weightlifting; however, there may be no history of obvious antecedent trauma. Although 80% of PSS cases are associated with thoracic outlet syndrome,^{16,13} only 1% to 12% of patients with thoracic outlet syndrome have complaints consistent with PSS.^{14,15}

arm and hand were more prominent than those of the left arm and did not recede with elevation of the extremity above the level of the heart. Distal radial pulses were full and equal bilaterally without delay, and she was neurologically intact. A Doppler scan of her right upper extremity was read as normal.

The next morning, the patient's symptoms were only mildly decreased, and the physical exam was unchanged. The circumference of the right arm was approximately 2 cm greater than the left, from the proximal arm to the distal forearm. Compartments of the forearm and upper arm were soft and nontender. An Adson's maneuver obliterated the radial pulse on the right side but not on the left. The patient underwent a right upper-extremity venogram that showed an extensive thrombus with complete occlusion from the right axillary vein extending into the subclavian vein. Significant collateralization was also noted (Figure 1).

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Effort Thrombosis in the Elite Throwing Athlete

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From the *Department of Orthopaedic Surgery, Washington University School of Medicine at Barnes-Jewish Hospital, St. Louis, Missouri, and the †Campbell Clinic, Germantown, Tennessee

Background: Upper extremity vascular injuries are uncommon in the elite throwing athlete. However, the extreme stresses that are placed on the upper extremity of elite baseball players, especially pitchers, puts them at risk for such injuries. One such injury is upper extremity venous thrombosis or "effort thrombosis."

Purpose: We wanted to review the common initial clinical symptoms and physical examination findings of effort thrombosis in elite baseball players and to review the associated clinical conditions such as hypercoagulable states and pulmonary embolism.

Study Design: Retrospective review of a series of cases.

Methods: A retrospective review of the medical records of a Major League Baseball organization and a Division I college was performed for the period 1987 to 1997.

Results: We located four cases of effort thrombosis involving elite baseball players. Contrast venography was used to confirm the diagnosis in all cases. All patients were successfully treated with transluminal catheter-directed urokinase thrombolysis followed by first rib resection and systemic anticoagulant therapy for up to 3 months. All four players returned to play at or above their previous level of competition with no long-term chronic sequelae.

Conclusions: Prompt clinical recognition, diagnosis, and treatment of effort thrombosis in the elite baseball player provides the player with an excellent prognosis for return to the previous level of play.

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A 21-year-old female, right-hand dominant, college volleyball outside hitter presented following a match with complaints of swelling, tightness, heaviness, and aching of her right arm. She noticed mild symptoms during warm-ups, then had increasing symptoms early in the match and was unable to continue play. She denied shortness of breath, chest pain, or any history of trauma to her right arm and was otherwise healthy. She denied personal or family history of hematological disorders and denied smoking or illicit drug use. Her only medication was an oral contraceptive.

On examination, the patient had full range of motion of her right arm and shoulder, and resistance testing revealed full and symmetric strength. There was, however, definite swelling of the entire right arm. The veins in her right fore-

The patient was admitted to the ICU and started on heparin anticoagulation and t-PA thrombolytic therapy.

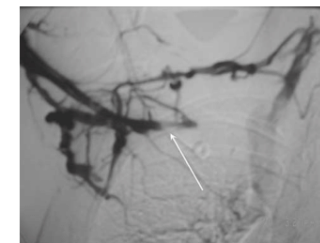


Figure 1. Prethrombolysis venogram showing complete occlusion of the axillosubclavian vein and significant collateralization.

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Surg Today (2007) 37:■■■■
DOI 10.1007/s00595-007-3528-2



Push-Up Exercise Induced Thrombosis of the Subclavian Vein in a Young Woman: Report of a Case

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Abstract

Deep venous thrombosis (DVT) is common, but only 2%–4% of DVTs involve the upper extremities (Roos in Am J Surg 154:568–73, 1987). Upper extremity DVT has a primary or secondary cause, and primary thrombosis is much rarer than secondary thrombosis. Primary upper extremity DVT comprises effort venous thrombosis and idiopathic thrombosis. Effort subclavian venous thrombosis, also called Paget-Schroetter syndrome, is an uncommon entity, which usually develops after strenuous effort of the upper extremities. Effort thrombosis of the upper extremity has been described in athletes involved in a wide variety of sports, including ball games, combatant sport and heavy athletics, games with rackets or clubs, and aquatic sports (Zell et al. in Angiology 52:337–42, 2001). Push-up exercise is a strengthening exercise for building up strength and endurance in the muscles of the upper arm and shoulders. It is also considered to be a core exercise in shoulder rehabilitation programs to activate the serratus anterior muscle in people with shoulder dysfunction (Ludewig et al. in J Sports Med 32:484–93, 2004). We report what to our knowledge is the first case of effort DVT of an upper extremity caused by push-up exercise.

ops after strenuous effort of the upper extremities. We report a case of Paget-Schroetter syndrome caused by push-up exercise.

Case Report

A 27-year-old businesswoman whose work and lifestyle were devoid of strenuous activities of the upper extremities attempted to do some push-up exercises to alleviate chronic headache. She completed three sets of 1-min push-ups. The next morning, she noticed swelling, heaviness, and tightness in her right upper arm. She presented to our hospital 5 days later as her symptoms did not resolve. She denied any shortness of breath, chest pain, right arm pain, or history of trauma to her right arm. She was otherwise healthy and did not report any personal or family history of hematological disorders and denied using oral contraceptives. She reported smoking 10 cigarettes per day. On physical examination, she was well hydrated and had normal range of motion of her right arm and shoulder and no jugular vein distension or dilated peripheral veins around the right shoulder. Her distal radial pulses were strong and equal, and there was no neurological deficit. However,

Brandon Ingram's Deep Venous Thrombosis ends his breakout season early



- Angeles Lakers forward Brandon Ingram has been diagnosed with deep venous thrombosis (DVT) in his right arm and will miss the rest of the season. March 9, 2019

Clinical Journal of Sport Medicine
4:192–196 © 1994 Raven Press, Ltd., New York

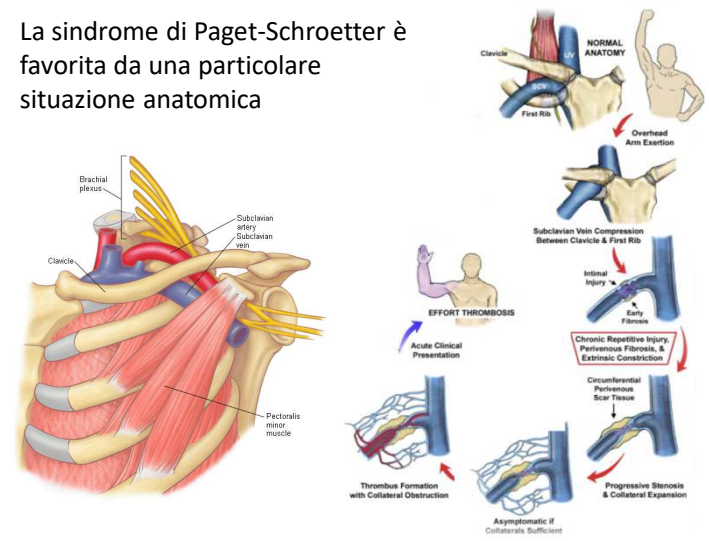
Successful Outcome of Conservative Management of Axillary Vein Thrombosis in an International Basketballer

Karim Khan, M.D., Peter Harcourt, M.D., and *Peter Blombery, M.D.

Alphington Sports Medicine Clinic and *The Alfred Hospital, Monash University, Melbourne, Australia

Abstract: Axillary vein thrombosis is a relatively uncommon condition in sportspeople other than those undergoing weight training, and to our knowledge this is the first case report in a basketballer. Whether to opt for conservative or surgical management of axillary vein thrombosis remains controversial. We report a successful return to elite level performance in a player with thrombosis managed conservatively. **Key Words:** Axillary vein thrombosis—Basketball injuries. *Clin J Sport Med* 1994;4(3):192–6.

La sindrome di Paget-Schroetter è favorita da una particolare situazione anatomica



Nel caso del basket non ci sono particolari rapporti anatomici, ma il trauma associato alla meccanica potrebbe essere sufficiente

Peso dei soggetti
Dinamica del gesto tecnico



Stare seduti a lungo

- **Similar conditions to air travel**, such as sitting for many hours in air raid shelters in London during the blitz, were associated with a **sixfold rise in sudden death from pulmonary embolism**.

Ruolo della stasi

The association between air travel and deep vein thrombosis: Systematic review & meta-analysisYaser Adi^{1*}, Sue Bayliss¹, Andrew Rouse² and R S Taylor¹

Address: ¹Department of Public Health & Epidemiology, University of Birmingham, Birmingham B15 2TT, UK and ²Heart of Birmingham Teaching Primary Care Trust, Birmingham B16 9PA, UK
 Email: Yaser Adi^{*} - y.ad@bham.ac.uk; Sue Bayliss - s.bayliss@bham.ac.uk; Andrew Rouse - Andrew.Rouse@hobipct.nhs.uk; R.S.Taylor - r.s.taylor@bham.ac.uk
 * Corresponding author

Background: Air travel has been linked with the development of deep vein thrombosis (DVT) since the 1950s with a number of plausible explanations put forward for causation. No systematic review of the literature exploring this association has previously been published.

Methods: A comprehensive search was undertaken (Data bases searched were: MEDLINE, EMBASE, Cochrane Library) for studies that estimated both the incidence and the risk of DVT in air travellers relative to non-air travellers.

Results: In total 254 studies were identified but only six incidence studies and four risk studies met inclusion criteria justifying their use in a systematic review. Incidence of symptomatic DVT ranged from (0%) in one study to (0.28%) which was reported in pilots over ten years. The incidence of asymptomatic DVT ranged from (0%) to (10.34%). Pooled odds ratios for the two case control studies examining the risk of DVT following air travel were 1.11 (95% CI: 0.64–1.94). Pooled odds ratios for all models of travel including two studies of prolonged air travel (more than three hours) were 1.70 (95% CI: 0.89–3.22).

Conclusion: We found no definitive evidence that prolonged (more than 3-hours) travel including air travel, increases the risk of DVT. There is evidence to suggest that flights of eight hours or more increase the risk of DVT if additional risk factors exist.

Extensive deep vein thrombosis following prolonged gaming ('gamer's thrombosis'): a case reportHsien-Cheng Leon Chang¹, Hayley Burbridge and Conroy Wong**Abstract**

Introduction: The average time spent playing video games is increasing. Prolonged immobility associated with gaming may therefore be an important risk factor for venous thromboembolism. We report a case of deep vein thrombosis associated with prolonged playing of PlayStation[®] games.

Case presentation: A 31-year-old Caucasian man, an exterior painter, presented with a three-day history of left leg pain and swelling after playing PlayStation[®] games for almost eight hours a day for four consecutive days. Doppler ultrasound of the left leg confirmed extensive left leg deep venous thrombosis requiring thrombolysis and anticoagulation.

Conclusions: Video gaming should be considered a risk factor for venous thromboembolism. Further studies are needed to estimate the degree of risk associated with prolonged periods of playing video games, and education for preventing venous thrombosis should be provided to gamers.

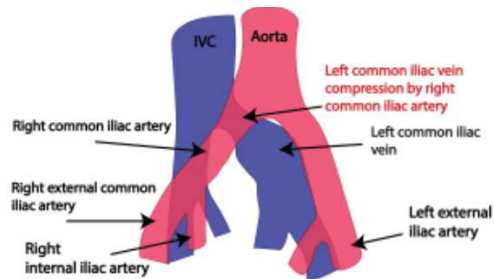
Keywords: Video games, Venous thromboembolism, DVT

Travel-related venous thrombosis: results from a large population-based case control study

- Traveling in general increased the risk of venous thrombosis 2-fold
- The risk of flying was similar to that of traveling by car, bus or train
- The risk was higher in those who were more than 1.90 m tall



May-Thurner syndrome



Ruolo dell'infiammazione

Risposta di fase acuta

3 settembre 2010, Brian Vickers (pilota di auto)

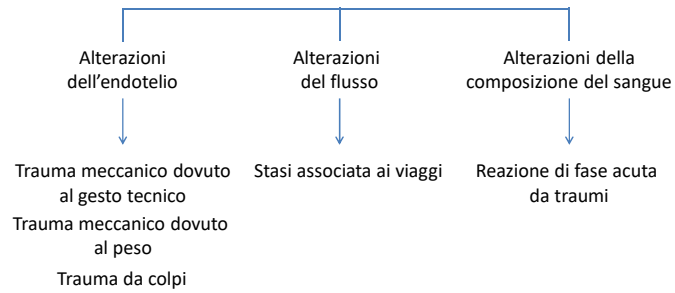


Vickers was taken to the hospital where experts found multiple areas of blood clots in the veins of both Vickers' legs and lungs. The source of these clots was found to be from a **pinched vein in the pelvis**. ... Most commonly, May-Thurner Syndrome presents as a clot in the leg, known as a DVT- or, deep venous thrombosis.

Infortuni comuni nei giocatori di basket

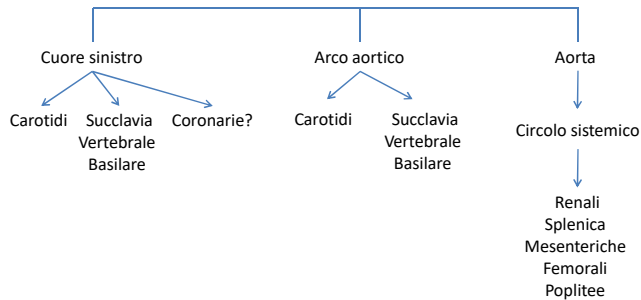
- Distorsione di caviglia
- Fratture da stress del piede
- Fratture della mano e del polso
- Tendiniti e rottura del tendine di Achille
- Fratture del naso e del volto
- Rottura di ligamenti del ginocchio
- Infortuni muscolari
- Concussione

Triade di Virchow

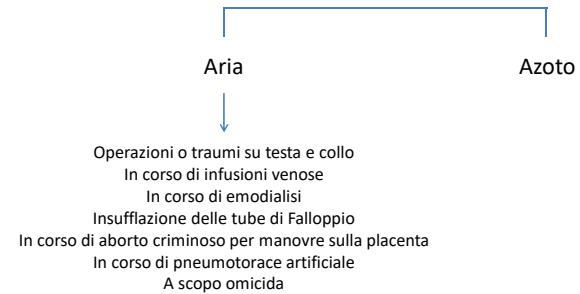


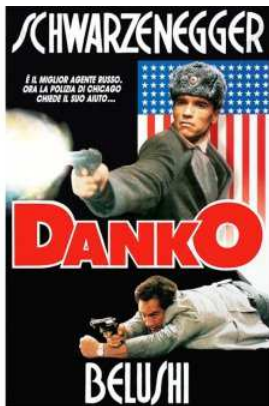
La localizzazione degli emboli arteriosi dipende dal punto di partenza

Partenza



2. Embolia gassosa





Un compare del georgiano Victor Rosta è ucciso in ospedale da un complice con una siringata di aria nella flebo.

Aria

↓
Cuore destro

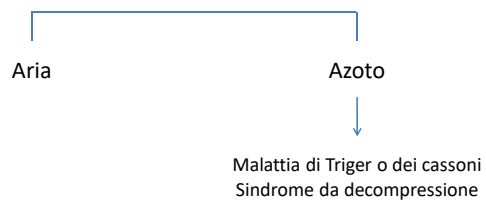
↓
Si forma schiuma

↓
Compressione della schiuma in sistole

↓
Effetti simili all'embolia polmonare massiva

È stato calcolato che ci vogliono 100-200 ml di aria per uccidere un adulto.

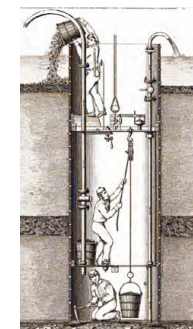
Embolia gassosa



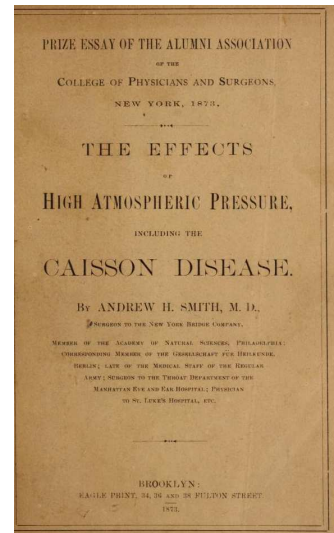
Malattia di Triger



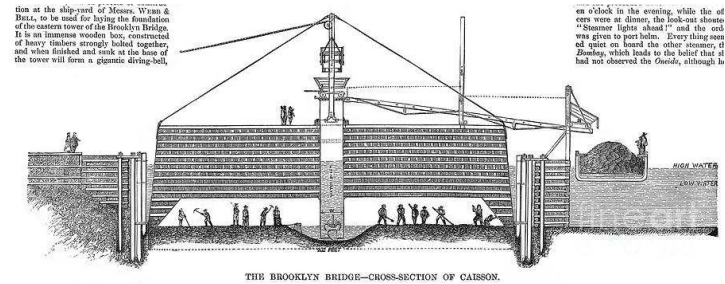
Jacques Triger (1801-1867)



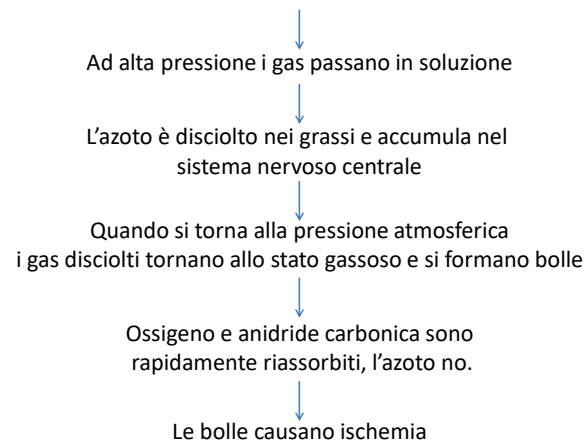
Andrew Smith
(1837-1910)
malattia dei
cassoni



Malattia dei cassoni



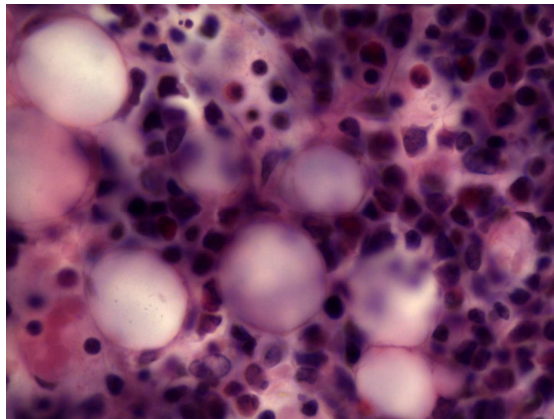
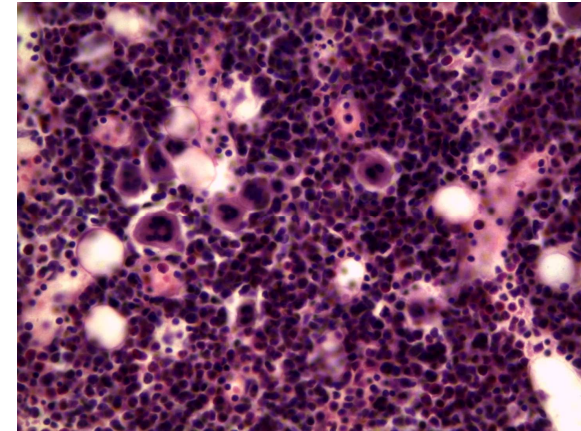
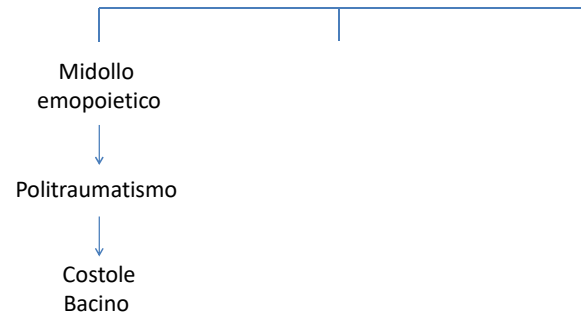
Aria compressa



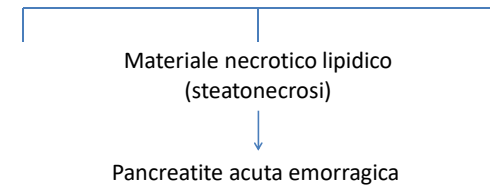
Sindrome da decompressione

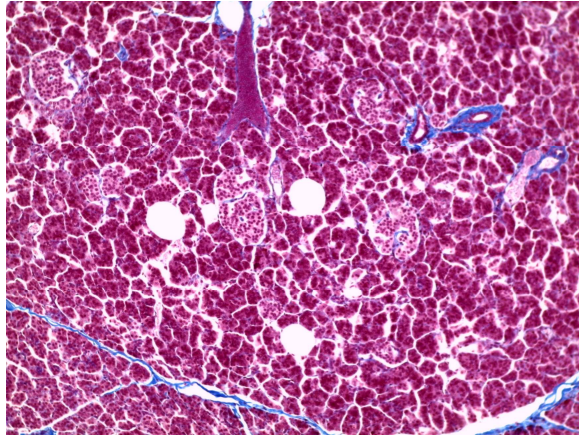
Quando i sub tornano troppo rapidamente in superficie

3. Embolia grassosa



3. Embolia grassosa

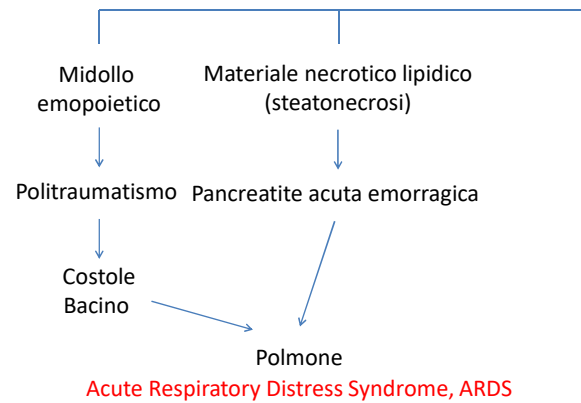




Pancreatite acuta



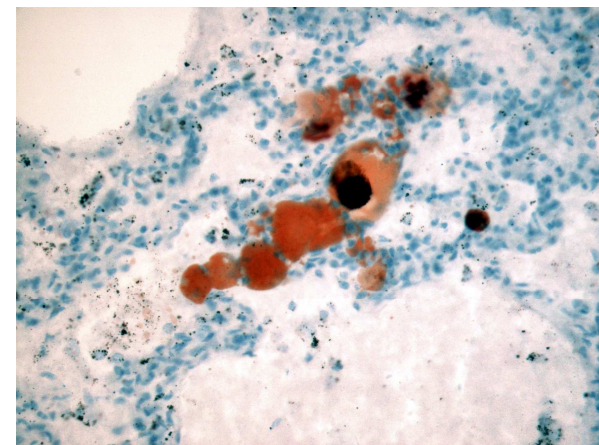
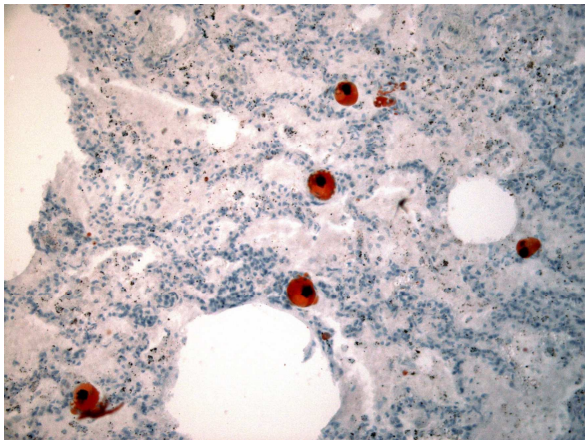
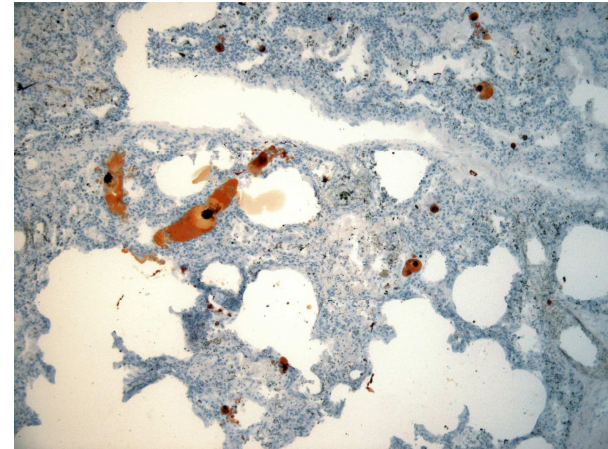
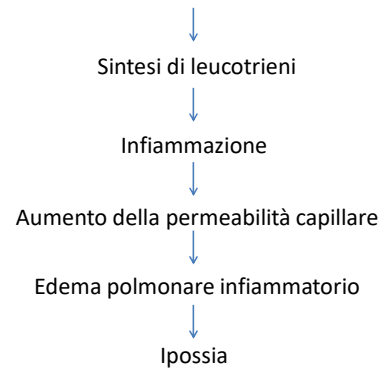
3. Embolia grassosa



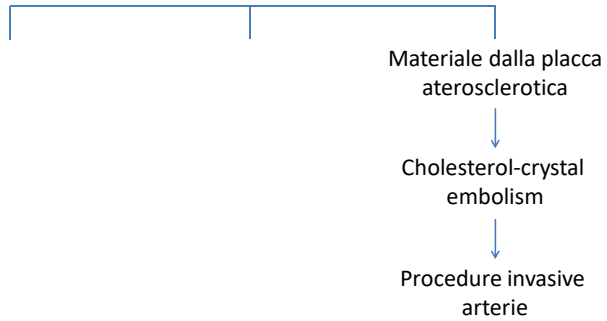
Nel polmone, l'effetto degli emboli grassi **non è** meccanico

I lipidi agiscono come sorgente di acido arachidonico per la sintesi di leucotrieni

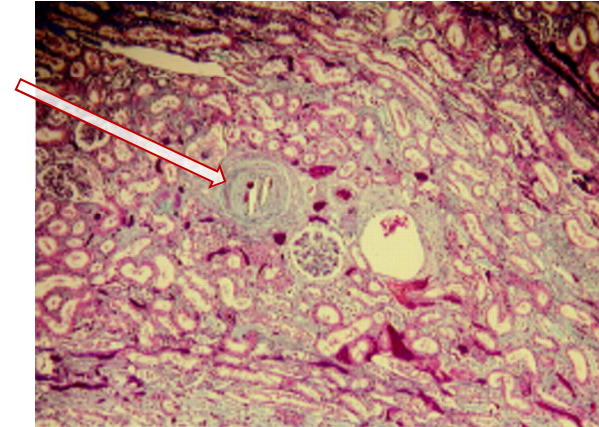
Embolo grassoso



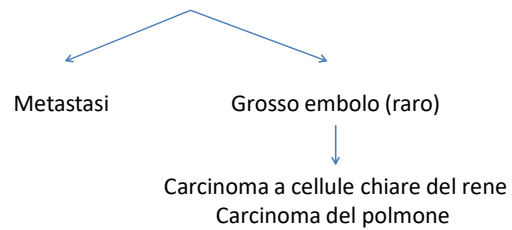
3. Embolia grassosa



Colesterol Crystal Embolism del rene



4. Embolia neoplastica



5. Embolia da liquido amniotico

