

AGE AND GENDER FACTORS IN HYPERTENSION

Highlights

Dubrovnik (Croatia), April 21-22, 2017

Introduction



Prof. Jelaković and Prof. Grassi, chairmen of the symposium, opened the congress, by highlighting the high scientific level of this meeting focusing on Hypertension, Age factors and Gender under the patronage of the European Society of Hypertension and the Croatia Society of Hypertension. Many top researchers in hypertension, coming from all the world attended this symposium together with young physicians. This congress represented a very unique occasion for a full update on Hypertension, Ageing

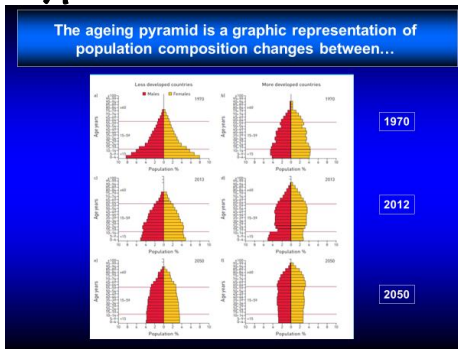
and Gender linked to Precision Medicine.

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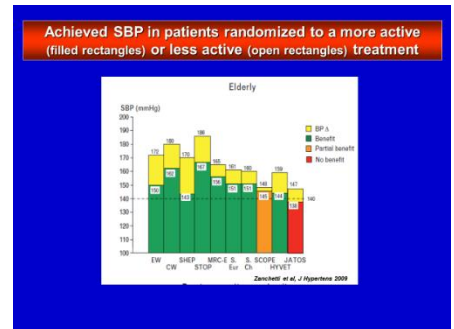
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Hypertension in the elderly: the ESH/ESC Guidelines position

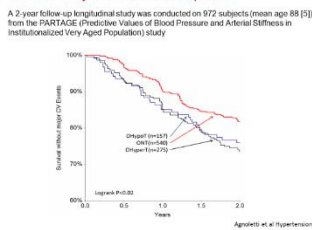


The ESH/ESC Guidelines position on Hypertension in the elderly, was the topic discussed by Prof. Agabiti Rosei in his lecture. The speaker, coming from Brescia (IT), went deeper in his talk and presented very interesting data on the aging pyramid, by highlighting that 1.3% of the global population is composed by elderly people over 75 years and this number will increase till 4.4% in 2050. In the main part of his presentation, Prof. Agabiti Rosei talked about the residual risk for developing

hypertension and the related mortality rate due to ischaemic heart disease and stroke. The speaker presented also very interesting data on the so called pseudohypertension, the white coat effect and the white coat hypertension, the ABPM measurements and finally on the home BP measurements. Prof. Agabiti Rosei presented also very interesting data on the results of the main clinical trials running in hypertensive elderly patients. More in particular he spoke about SHEP, SYST-EUR, HYVET and SPRING studies and presented a huge amount of data on the potential benefits, but also on the adverse events due to the antihypertensive treatment in elderly and very elderly people. Finally, the speaker talked about the major issues linked with the intensive treatment protocol applied to elderly people and more in particular in frail subjects. Prof. Agabiti Rosei, talked also about the combination therapy in the elderly



Evidence for a Prognostic Role of Orthostatic Hypertension on Survival in a Very Old Institutionalized Population



and more in particular on the effects of the fixed combinations in term of adherence to therapy and about the correlation between dementia and blood pressure, by highlighting that more effective is the antihypertensive treatment, more evident is the prevention of dementia. In conclusion, Prof. Agabiti Rosei, pointed out that specific trials in groups of patients well characterized from a phenotypic point of view and possibly also by genetic markers, may be the most useful approach for assessing when to start the treatment and how low BP should be reduced.

treatment and how low BP should be reduced.

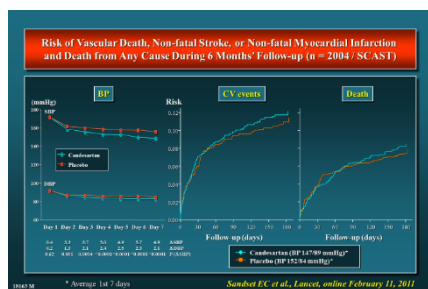
- What are the main characteristics of hypertension in the elderly?
- Is automated unattended SBP 120 mmHg equal to office SBP 135 mmHg?
- Should we modify our therapeutic strategy in very old frail subjects?
- What's about the correlation between orthostatic hypertension and the survival rate in very old subjects?
- What's about the correlation between Dementia and Blood Pressure?

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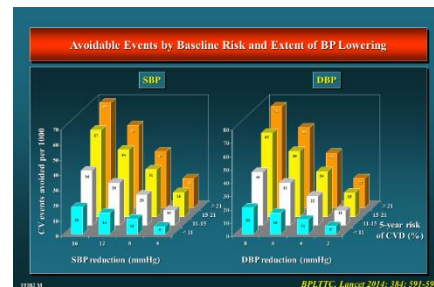
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Reappraisal of the European guidelines

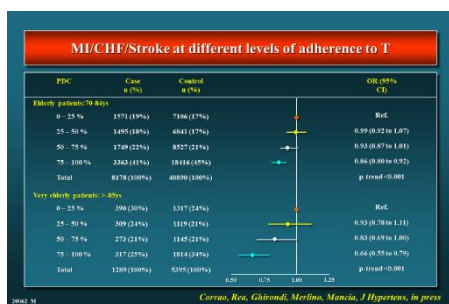


Prof. Mancia from Milan (IT), spoke about the reappraisal of the European guidelines. The speaker went deeper in his talk, by presenting very interesting and data on the correlation between BP values and the onset of cardiovascular complications. More in particular the speaker talked about the role played by hypertension in the onset of dementia, by highlighting the effect of the antihypertensive

treatment on the overall cognition thanks to the results of some randomized controlled trials. Prof. Mancia presented a huge amount of data about the relationship between CV risk factors, blood pressure levels and antihypertensive treatment, with the intention to find a comprehensive answer about the right BP levels to be achieved with the antihypertensive treatment in the elderly. The speaker presented very impressive data on the correlation between MI/CHF/Stroke incidence and the levels of adherence to therapy, by



highlighting that adherence reduces the risk of MI, CHF and Stroke in the elderly and in the very old ones. Finally, Prof. Mancia talked about the correlation between adherence and combination treatment and about the advantages of the initial combination treatment, by highlighting that the combination therapy reduces the risk of complications. In conclusion, Prof. Mancia pointed out that in the future, the new guidelines on hypertension have to recommend the combination therapy as the first therapy level.



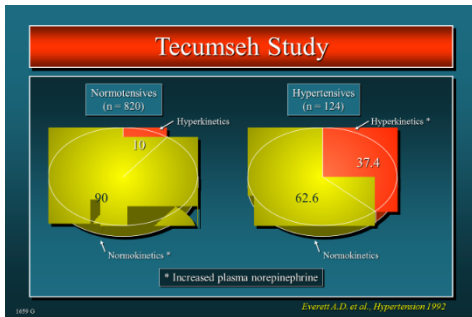
- Should low/moderate risk grade 1 hypertensive patients be treated?
- What's about the target BP in the elderly after the SPRINT trial?
- What are the main SPRINT/Interpretation problems from the speaker point of view?
- What's about the relationship between outcomes prevented with the therapy and the numbers of excess in treatment discontinuations?
- Is the treatment beneficial also in frail very elderly patients?
- Which BP threshold and target for treatment are appropriate?
- What's about the combination therapy from the speaker point of view?

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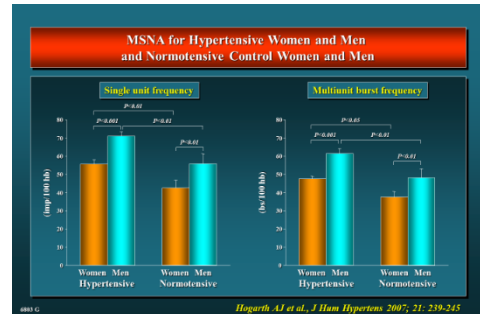
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Blood pressure regulation and gender in hypertension

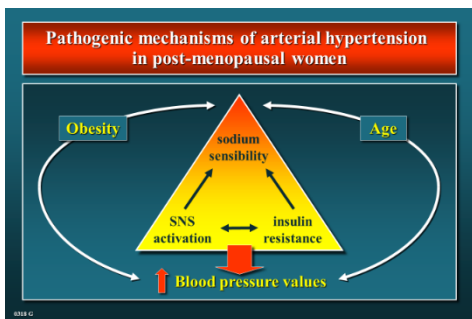


Blood pressure regulation and gender in hypertension was the topic discussed by Prof. Grassi. At the beginning of his talk the speaker, coming from Milan (IT) presented very interesting data derived from many epidemiologic and registries studies on the relationship between HT and gender from a pathophysiological point of view and on the related mechanisms which affect BP. Going

deeper in his lecture, Prof. Grassi talked about the sympathetic activation and its role in the cardiovascular continuum and about the effects of gender on systemic hemodynamic. In the main part of his talk, Prof. Grassi presented very interesting data on other factors claimed to be responsible for



HT disease in women, like SNS activity, humoral variables, sodium sensitivity and insulin activity. The speaker highlighted that, based on the data produced in many clinical studies, the sympathetic activations seems stronger in men than in women. In conclusion, Prof. Grassi pointed out that there are a lot of factors addressing the differences between men and women in the sympathetic activation.



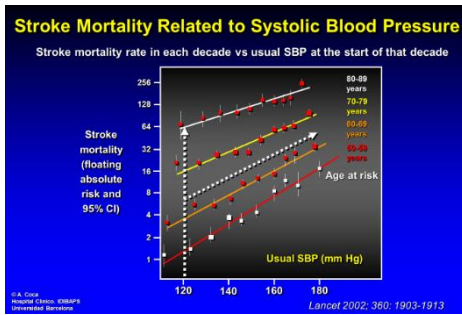
- Is gender important in HT pathophysiology?
- What's about the Tecumseh study?
- What are the main effects of gender on systemic hemodynamic in HT patients?
- What's about the effects of age and gender on sympathetic neuronal function?
- What's about the ambulatory BP in the menstrual cycle based on the data presented by the speaker?
- What are the pathogenetic mechanisms of arterial hypertension in post-menopausal women from the speaker point of view?

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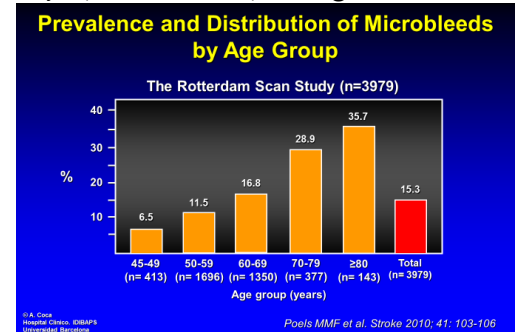
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Brain and aging

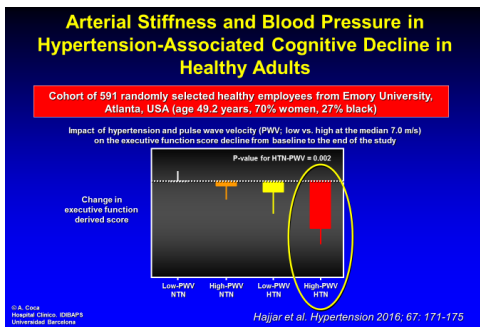


Brain and aging was the topic discussed by Prof. Coca. The speaker, coming from Barcelona (ES), introduced his talk by highlighting that aging, together with hypertension, is the main risk factor for brain damage and stroke. Going deeper in his lecture, the speaker talked about the main factors leading to the aging of organs and whole body and about the anti-aging factors, like physical activity, weight reduction and the Mediterranean diet

style. In the main part of his lecture, Prof. Coca presented very interesting data on the pathophysiology of the brain damage due to hypertension, by highlighting that this silent disease acts on the brain arteries through the vascular remodelling, leading to the lacunar ischemic lesions of the white matter. The speaker pointed out that hypertension strongly correlates with the white matter silent lesions. Prof. Coca talked also about the correlation between hypertension and dementia,



by highlighting that hypertension accelerates the progression of Alzheimer-like pathology in a mouse model, probably through its vascular damage. The risk of cognitive decline is significantly increased in hypertensive patients, more in particular, when the signs of arterial stiffness are present, the speaker pointed out. Finally, Prof. Coca, presented very interesting data given by observational studies, on the effects of the anti-hypertensive treatment on the white matter lesions.



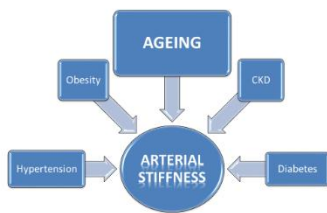
- What's about the correlation between the vascular age and the real age from the speaker point of view?
- What are the main factors leading to the aging of organs and whole body?
- What are the main steps of the pathophysiology of the brain damage in hypertension?
- What's about the microbleeds prevalence and distribution in old hypertensive people?
- What is the effect of the anti-hypertension therapy on the progression of the white matter lesions?
- When does cognitive decline starts in hypertensive patients?

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Arterial stiffness in children and adolescents

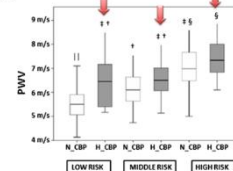


Zeman et al. Arterioscler Thromb Vasc Biol. 2005;25:932-943

The arterial stiffness in children and adolescents was the topic of Prof. Stabouli presentation. The speaker, coming from Thessaloniki (GR), started her lecture, by highlighting that the arterial stiffness is due to a lot of mechanisms involving all the vascular structures from the intima to the adventitia. Going deeper in her talk, the speaker presented a huge amount of data given by clinical studies

Central BP and PWV in low, middle and high cardiovascular risk

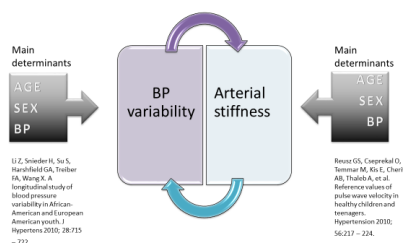
• Ongoing study on the effects of obesity and type 2 diabetes mellitus
 • 430 normotensive subjects (NT); 16–24 years, 34% male, 44% Caucasian, 27% type 2 diabetes)



Totaro et al. J Am Soc Hypertens 2015;9(4):285-292

running in children and adolescents on the effect of ageing on the arterial stiffness. More in particular Prof. Stabouli talked about the correlation between PWV and children according to age and height, by highlighting that in most pediatric PWV

SBP variability has a causative role or it is a result of arterial stiffening?



U Z, Savelbergh H, Xu S, Hanchfield GA, Traiber M, Wang X, et al. Longitudinal study of blood pressure variability in African-American and European-American youth. J Hypertens 2010; 28:715-722.

Russo GA, Cappelletti D, Tommasi M, Kik E, Chiodi AB, Thibault A, et al. Reference values of pulse-wave velocity in healthy children and teenagers. Hypertension 2010; 56:217-224.

studies there are a lot of methodological issues. In the last part of her presentation, the speaker talked about the correlation between SBP variability and the arterial stiffness. Finally, Prof. Stabouli presented very interesting data on the relationship between PWV and youth affected by type 1 diabetes and on the relationship between cardiovascular risk factors and arterial stiffness in these patients.

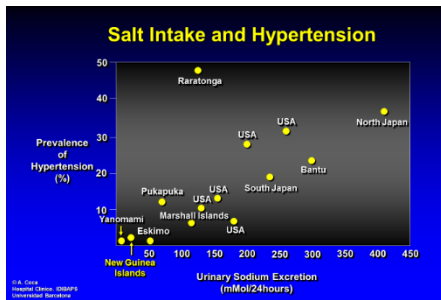
- What are the main methodological issues of the most pediatric PWV studies from the speaker point of view?
- What's about the relationship between SBP variability and arterial stiffness from the speaker point of view?
- What's about the correlation between arterial stiffness and type 1 diabetes from the speaker point of view?

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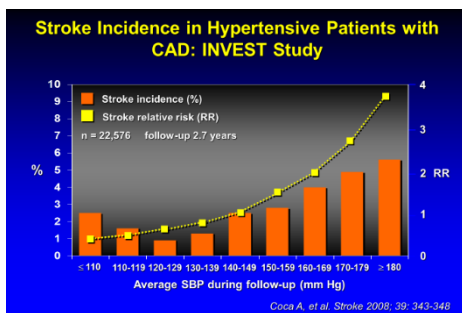
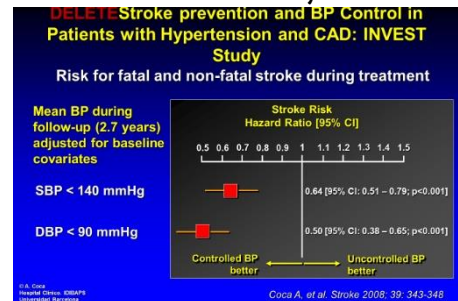
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Salt intake and hypertension: where are we?



“Salt intake and hypertension: where are we?” was the topic of Prof. Clement presentation. The speaker, coming from Ghent (BE), at the beginning of his lecture, addressed the audience by highlighting that the salt intake needed for our body necessity is ten time lower than the daily salt intake in Europe. Going deeper in his talk, Prof. Clement presented very interesting

data on the relationship between salt intake and hypertension, by highlighting that the salt intake reduction can be helpful in quite a large group of patients through the normalization of the BP levels, especially in the ones affected by mild hypertension. In the main part of his presentation, the speaker talked about the effects of the decrease of only 3 gr. of daily salt intake in men and women.



Prof. Clement, talked also about the risks due to a decrease in salt intake less than 8 gr. a day, by highlighting that under this level the events significantly rise. Finally, Prof. Clement presented very interesting data on the correlation between BP control and salt intake, by pointing out that the reduction of the salt intake is very effective in the achievement of the BP control.

- What are the main effects of the reduction of the daily salt intake based on the data presented by the speaker?
- How low the salt intake has to be decreased from the speaker point of view?
- What’s about the U-shaped curve of the salt intake from the speaker point of view?

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Telomeres and life span

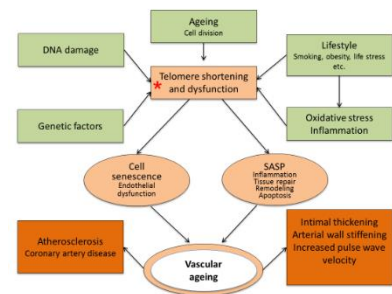
Telomere structure: an overview

- Telomeres are the ends of chromosomes
- Human telomeres consist of TTAGGG repeats
- Function is to protect the ends of chromosomes from fusion or damage
- Genetics of telomere biology significantly associated with CAD (Nat. Genet. 2013;45:422-7)
- Shorter telomeres predictive of IHD, but not of stroke in meta-analysis (Haycock PC, et al. BMJ 2014)



Prof. Nilsson, coming from Malmö (SE) spoke about telomeres and life span, by presenting very interesting data on the correlation between their alterations in structure and function and the CADs. Going deeper in his lecture, the speaker presented very interesting data on the correlation between telomeres, their structure and CAD risk factors and ageing. In the main part of his talk, Prof.

Nilson spoke about the relationship between the shorter telomere length and the prevalence of the cerebrovascular disease risk factors, insulin resistance and arterial stiffness. The speaker talked also about the association between the left ventricular hypertrophy and the presence of longer



Fyhriqvist E, et al. 2015

Association of Insulin Resistance, Arterial Stiffness and Telomere Length in Adults Free of Cardiovascular Diseases

Irina Strazhesko¹*, Olga Tkacheva¹, Sergey Boytsov², Dariga Akasheva¹, Ekaterina Dudinskaya¹, Vladimir Yagodkin¹, Dmitry Skvortsov¹, Peter Nilsson³



PLOS ONE | DOI:10.1371/journal.pone.0136078 August 05, 2015

telomeres than normal, based on the data of the Framingham heart study. In the last part of his lecture, Prof. Nilsson, presented very interesting data given by mendelian studies on the genetic markers of the biology of telomeres and their relationship with the risk of CAD. In conclusion, the speaker pointed out that the telomere length and its changes over time could represent a marker of biological aging and of increased CHD risk, also linked to insulin resistance.

- What is the correlation between the telomere shortening and the risk of MI?
- What's about the correlation between telomeres and ageing?
- What's about the human model of telomeres and stress?

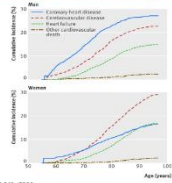
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Hypertension and genders: similarities and differences

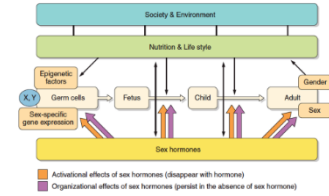
Large differences exists in the first manifestation of cardiovascular disease



Leong et al. BMJ 2014;349:g2092

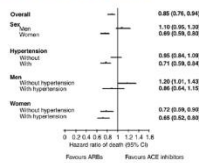
Prof. Redon, coming from Valencia (ES) spoke about Hypertension and genders: similarities and differences, by presenting very interesting data on the differences between the first manifestations of the cardiovascular disease in men and women. Going deeper in his lecture, the speaker talked about the main factors linking hypertension and gender, like sex-specific gene expressions, epigenetic factors and sex hormones. More in particular, Prof. Redon presented very interesting data on the hormonal effects of the BP regulation, on the impact of gender on hypertension and on the relationship between the left ventricular mass, the arterial stiffness,

Overview of hypertension and gender across life



the HTN treatment and gender. Speaking about the anti-hypertensive drugs, Prof. Redon, pointed out that ACEi and ARBs have a different degree of protection in men and women, more in particular in the ones affected by heart failure. In conclusion, Prof. Redon, pointed out that personalized medicine is needed for reducing the impact of the gender differences in HTN treatment.

Different degree of protection of ACEi and ARB on heart failure by gender



Halperin et al. Eur J Heart Fail 2007;9:632-639

- What is the hormones' impact in the immune system in men and women?
- What's about the correlation between the Y chromosome, Sry gene and hypertension, based on the data presented by the speaker?
- What's about left ventricle mass and gender?
- Why there is a different degree of protection of ACEi and ARBs in men and women affected by heart failure?
- What's about the relationship between HTN treatment and gender?

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A case for less intensive BP Control in the elderly: it matters to achieve target blood pressure early and sustained below 140/90 mmHg

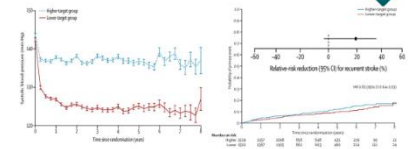
Table 1. Baseline characteristics of participants in the prospective and randomized clinical trials.

Baseline Characteristics	HOT	ACCORD	SPS3	SPRINT, intensive treatment	SPRINT, standard treatment
Study population	6038	428	626	626	626
Age (years)	67.3	67.3	67.3	67.3	67.3
Men (%)	87	87	87	87	87
Mean SBP (mmHg)	157	157	157	157	157
Mean DBP (mmHg)	95	95	95	95	95
Mean SBP/DBP (mmHg)	157/95	157/95	157/95	157/95	157/95
SBP/DBP ratio	1.65	1.65	1.65	1.65	1.65
SBP/DBP ratio < 1.6	10	10	10	10	10
SBP/DBP ratio > 1.6	90	90	90	90	90
SBP/DBP ratio > 1.6 and < 1.8	60	60	60	60	60
SBP/DBP ratio > 1.8	30	30	30	30	30
SBP/DBP ratio > 1.8 and < 2.0	20	20	20	20	20
SBP/DBP ratio > 2.0	10	10	10	10	10

Mariampillai J et al. Prog Cardiovasc Dis 2016; 59: 209-218

“A case for less intensive BP control in the elderly: it matters to achieve target blood pressure early and sustained below 140/90 mmHg” was the topic at the core of Prof. Kjeldsen presentation. The speaker, coming from Oslo (NO), presented very interesting data given by randomized and observational studies on the correlation between the BP reduction levels and the prevalence of CV events, by highlighting that there are no significant differences in the CV events rate between patients at intensive and standard blood-pressure control.

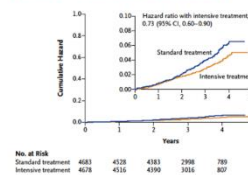
The Secondary Prevention of Small Subcortical Strokes (SPS3) Study (Stroke Survivors)



Benaeviste OR et al. Lancet 2013; 382: 507-515

Prof. Kjeldsen presented very interesting data on the effect of the BP control under 140 mmHg on the CV events rate, by highlighting that a more aggressive BP control does not achieve better results with the exception of the Stroke incidence rate.

SPRINT – All-Cause Mortality



All-Cause Mortality
Difference= 55 patients CV 28, non-CV 27

No. at Risk	Standard treatment	Intensive treatment
0	4683	4278
1	4126	4183
2	3996	3996
3	2996	2996
4	789	789
5	789	789
6	807	807

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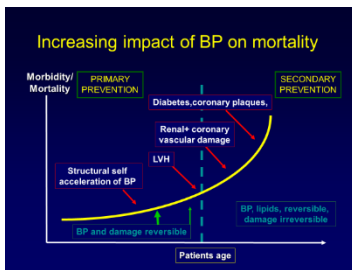
- How much should we lower blood pressure in the elderly, based on the data presented by the speaker?
- What is the incidence of MI in the HOT study?
- What is the prevalence of the Primary and Total Strokes in the ACCORD study, based on the data presented by the speaker?
- What’s about the unattended Automatic BP in SPRINT study?

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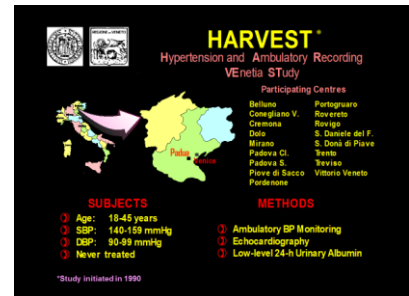
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Maybe more aggressive treatment targets in the young hypertensive patients – should we “normalize” their blood pressure such as recommended in the earlier hypertension guidelines?

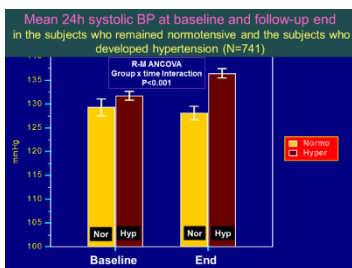


“Maybe more aggressive treatment targets in the young hypertensive patients – should we “normalize” their blood pressure such as recommended in the earlier hypertension guidelines?” was the topic discussed by Prof. Palatini. The speaker, coming from Padua (IT), presented very interesting data on the main guidelines recommendations

referring to the need to treat young people affected by stage 1 hypertension. Going deeper in his presentation, the speaker talked about the sex-specific differences in the incidence rate of



CVD mortality in people below 50 years old, by highlighting that the CVD mortality is higher in men than in women. In the last part of his talk, the speaker presented very interesting data given by the HARVEST study, that is the hypertension and ambulatory recording Venetia study, on the rate of atrial fibrillation and CV events during the follow-up period.



- What is the risk of CVD mortality according to Hypertension subtype in young and middle age subjects based on the data presented by the speaker?
- What is the sex-specific cumulative incidence rate of CVD mortality according to Hypertension subtype in people < 50 ys?
- What’s about the rate of atrial fibrillation and CV events during the follow-up in the HARVEST study?

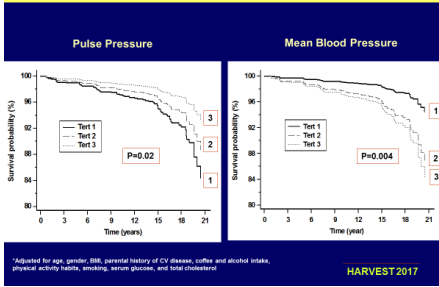
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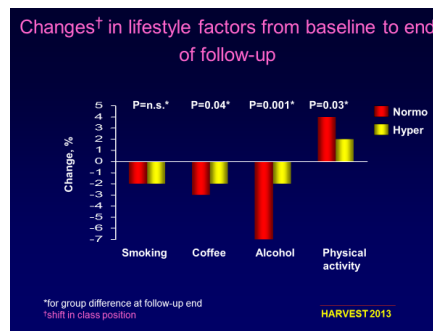
Summary young people – potential difference compared to elderly

Risk* of Major Adverse Cardiovascular Events in the HARVEST Participants (age range, 18-45 ys) by tertile of PP and MBP

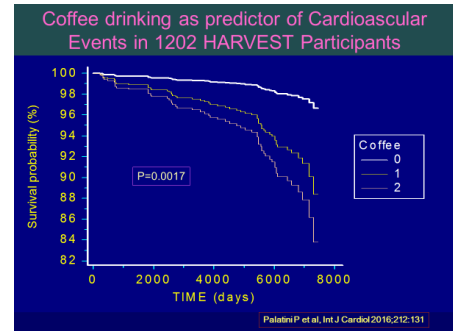


The potential difference in controlling hypertension in young people compared to the elderly, was the topic discussed by Prof. Palatini. The speaker coming from Padua (IT) talked about the data produced in the HARVEST study, characterized by the presence of people aged from 18 to 45 years old. Going deeper in his speech, Prof. Palatini

presented very interesting data on the risk of major adverse cardiovascular events in these patients divided by tertiles of Pulse Pressure and Mean Blood Pressure. In the main part



of his lecture the speaker talked about the central BP measurements and more in particular, about the 2013 ESH/ESC guidelines recommendations on the adoption of the lifestyle changes. In conclusion, Prof. Palatini pointed out that in stage 1 hypertensives at low CV risk a long period of observation should be allowed and the implementation of non-pharmacological measures should be strongly recommended.



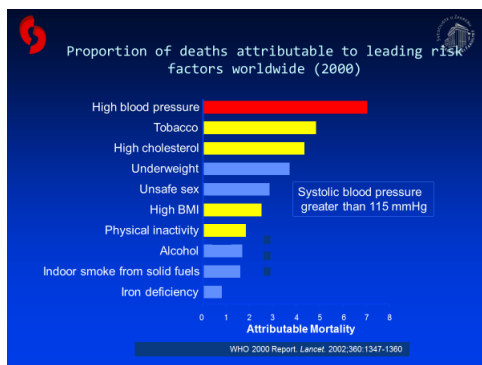
- Which BP targets in Hypertension of Youth?
- What's about the frequency of Events in the HARVEST participants according to the Lifestyle Risk Score?
- What's about the adoption of lifestyle changes present in the 2013 ESH/ESC guideline recommendations?
- What is the risk of Major Adverse Cardiovascular Events in the HARVEST participants according to smoking and alcohol use?

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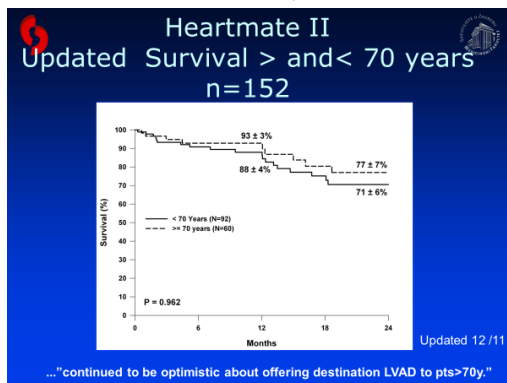
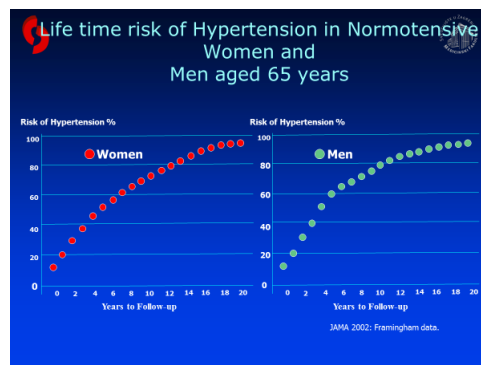
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Target organ damage - heart failure



Prof. Miličić from Zagreb (HR), presented very interesting data on the target organ damage in patients affected by heart failure. Going deeper in his lecture, the speaker talked about the main risk factors leading to the onset of heart failure and more in particular on hypertension that is the first one thanks to its correlation with the end-organ damage. In the main part of his lecture, Prof. Miličić presented very interesting data on

the cardiovascular continuum starting from hypertension to chronic heart failure, through the onset of CHD, left ventricular hypertrophy, left ventricular failure, arrhythmias, conduction system abnormalities and aortic regurgitation, all examples of the hypertensive heart disease, the speaker pointed out. Prof. Miličić, talked also about the hypertensive vascular disease including the aortic aneurism, the aortic dissection and the Pulmonary artery disease. Speaking about



heart failure, he presented many data on the two main forms, the first one with reduced ejection fraction and the second one with preserved ejection fraction and the related recommendations for preventing or delaying the development of the overt HF or death. In the last part of his presentation, Prof. Miličić talked about therapy, pharmacological and non-pharmacological like the VAD technique. In conclusion, the speaker pointed out that the heart failure can be prevented in most cases by treating comorbidities.

- What is the lifetime risk of hypertension in normotensive women and men aged 65 years old and over?
- What are the main examples of the hypertensive heart disease based on the data presented by the speaker?
- What's about the hypertensive cardio vascular disease from the speaker point of view?
- What is the prevalence and the incidence of Heart Failure, based on the data presented by the speaker?
- What's about VAD from the speaker point of view?

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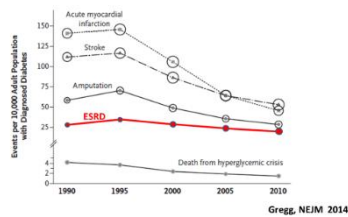
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Does J-curve exist in chronic kidney disease?

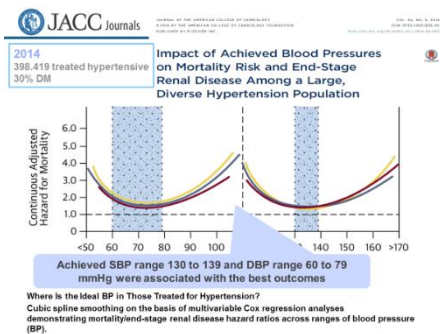
Changes in Diabetes-Related Complications in the United States, 1990–2010

Data from the National Health Interview Survey, the National Hospital Discharge Survey, the U.S. Renal Data System, and the U.S. National Vital Statistics System



Prof. Pontremoli from Genua (IT), presented very interesting data on the J curve in patients affected by chronic kidney disease. Going deeper in his lecture, the speaker talked about the role played by albuminuria in the onset of the end stage renal disease in diabetic patients, by highlighting that in reality 2 out of 3 patients with diabetic kidney disease do not have albuminuria. In the main part of his lecture, Prof.

Pontremoli pointed to the role played by the target BP in the onset of the end stage renal disease in diabetic patients, by highlighting that probably the best BP levels in these patients are about 130 mmHg and 60 to 79 mmHg for SBP and DBP respectively, based on the data published on JACC in 2014. The speaker presented a lot of data given by the main clinical trials and meta-analyses published on this topic, by highlighting that all the



data demonstrate that the reduction of BP levels is linked with the same reduction in the prevalence of the end stage renal disease and albuminuria. The speaker talked also about the relationship between the RAAS-Is and the presence of a J-curve effect in the elderly, by highlighting that patients in combination therapy may present a higher risk of events than patients in monotherapy. In conclusion, the speaker pointed out that the J curve effect is real and that together with the ischemic nephropathy may limit the risk/benefit ratio of any intensive treatment.

Combo RAAS-I in elderly patients: a population-based longitudinal analysis

CMAJ, Alberta Kidney Disease Network 2011

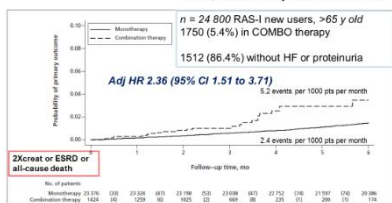


Figure 2. Kaplan-Meier curves for primary outcome (doubling of serum creatinine, development of end-stage renal failure or death from any cause) among the 24 800 patients for whom serum creatinine was measured before and after the start of treatment. Numbers in parentheses are the number of patients who had at least one of the three outcome events. Hazard ratio 2.36 (95% confidence interval 1.51 to 3.71).

- Is albuminuria a prerequisite for diabetic kidney disease?
- What's about the J curve relationship between BP and renal function in patients affected by Type 2 diabetes?
- What is the role played by GFR in the evolution of the CKD in patients with hypertension and diabetes?
- What's about the effects of the intensive blood pressure lowering treatment on the cardiovascular and the renal outcomes based on the data presented by the speaker?

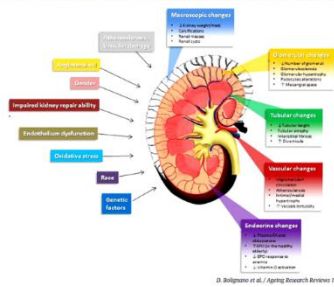
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Kidney function and aging

Macroscopic and microscopic changes in the aging and risk factors

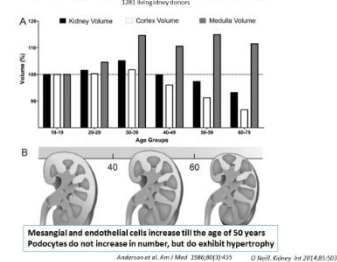


B. Bolognese et al. / Aging Research Reviews 14 (2014) 61–80

The main topic at the core of Prof. Jelaković presentation, was the kidney function and aging. The speaker, coming from Zagreb (HR), presented very interesting data on the potential mediators of the age-related decline in renal function, by highlighting the role played by specific genes in the onset of the renal aging. Going deeper in his lecture the speaker talked about the macro and microscopic changes due to the aging and the related risk factors,

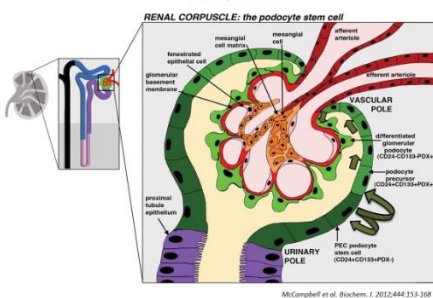
by presenting very interesting data on the gender differences in the aging of the kidney. In the main part of his lecture, Prof. Jelaković spoke about the hallmarks of the aging kidney, by highlighting that there is a very deep difference between young normal and aging normal kidney structure and function. In the second part of his talk, the speaker presented very interesting data on the mechanisms leading to the kidney senescence from a structural and a functional point of view, by highlighting that is very difficult to understand if these changes represent a normal situation or risk factors for ESRD. More in particular Prof. Jelaković, presented very interesting data on the role played by the GFR as a potential mediator of the age-related decline in renal function. Finally, the speaker talked about the potential strategies for the prevention of age-related nephropathy, by highlighting the role played by the cellular regeneration through the stem-cell therapy. In conclusion, Prof. Jelaković, pointed out that the kidney aging is a preventable and not an investable process.

The Hallmarks of the Aging Kidney
Effect of age on total kidney, cortical and medullar volumes
1281 Aging-Alterations



Anderson et al. Am J Med 2006;119:1043-1045 © 2006 Elsevier Inc 0169-5260/06

Cellular regeneration – stem cell therapy
Podocytes etc.



McCampbell et al. Biochem J 2012;444:313-318

- How to differentiate healthy aging from the chronic kidney disease?
- How to estimate eGFR in elderly?
- What are the main clinical consequences of low GFR in elderly?
- Is Kidney aging an inevitable or a preventable process?
- Which are the potential mediators of the age-related decline in the renal function?
- Which are the candidate genes involved in the renal aging, based on the data presented by the speaker?
- Do vascular changes precede or follow hypertension?

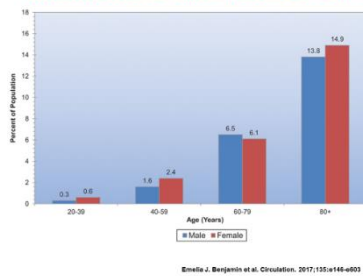
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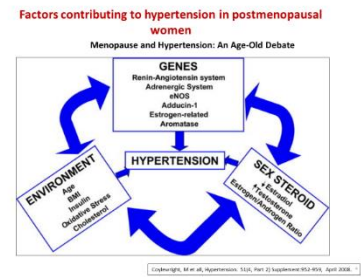
Menopause and hypertension

Prevalence of stroke by age and sex (NHANES 2011–2014).

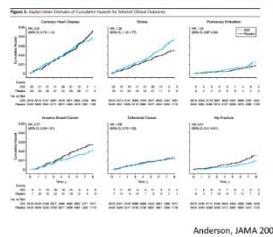


clinical studies on hypertensive menopause patients, with the intention to establish the presence or not of the link between menopause and

The main topic at the core of Prof. Brguljan presentation, was “menopause and hypertension”. The speaker, coming from Ljubljana (SLO), presented very interesting data, starting from a clinical case where the onset of menopause was associated with the onset of hypertension. Going deeper in her lecture, the speaker presented very interesting data given by



Hormone replacement therapy



and hypertension. In the main part of her talk, Prof. Brguljan spoke about treatment and more in particular about hormone replacement therapy, by highlighting that this treatment can lead to a higher incidence of CHD. In conclusion, the speaker pointed out that in these patients the relationship between hypertension and menopause is not well established based on the published data.

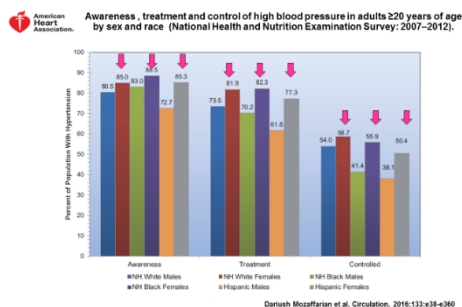
- What are the main factors contributing to hypertension in postmenopausal women, from the speaker point of view?
- What is the prevalence of high blood pressure in adults ≥ 20 years of age by sex and age?
- What is the effect of the cardiorespiratory fitness on vascular regulation and oxidative stress in postmenopausal women?
- What’s about the relationship between the hormone replacement therapy and the risk of heart disease?

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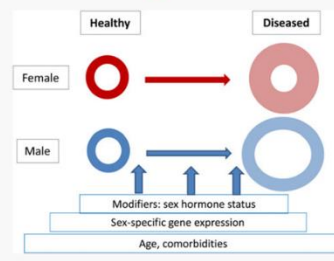
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Target organ damage

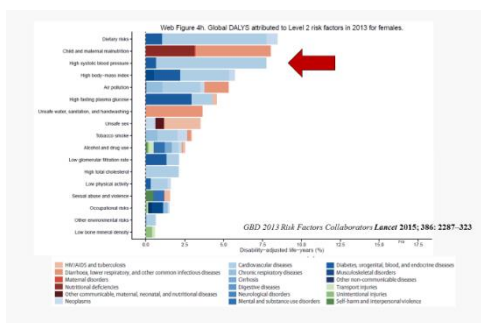


by highlighting that more women than men die for CVD. In the main part of her talk, the speaker presented very impressive data on the relationship between the onset of atherosclerotic lesions, age and gender, by highlighting that women are at higher risk than men. Prof. Muiesan talked also about the differences in the cardiac remodelling processes between women and men and presented very interesting data on the relationship between the circadian BP adaptation and gender, by highlighting that they are gender-specific. In the last part of her

Cardiac remodelling in women and men



lecture, the speaker talked about the differences in LV mass changes between women and men, by highlighting that in the hypertensive women the systolic function is higher than in the hypertensive men. Finally, Prof. Muiesan presented data on the differences between women and men in the myocardial energetic efficiency. In conclusion, Prof. Muiesan pointed out that in the elderly hypertension is more common in women than in men.



- What's about the 2011 AHA risk classification in women, presented by the speaker?
- What's about the differences in eGFR and albuminuria between women and men from the speaker point of view?
- What's about the sex differences in hypertension-related renal and cardiovascular disease in Italy, based on the data presented by the speaker?
- What's about the correlation between MMEi and aortic stiffness in women and in men?
- What are the main differences in the left ventricular mass changes related to the aortic stiffness based on the data presented by the speaker?

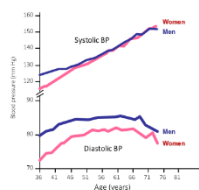
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Does aging affect hypertension/gender relationships?

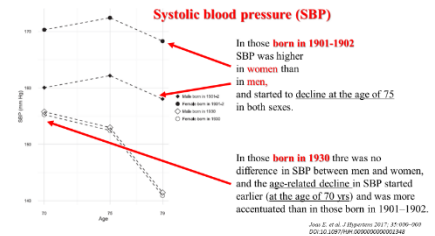
Age and average blood pressure (Framingham study)



Kannel et al 1978

data on the difference between man and women born at the beginning or in the 30th years of the 20th century, by highlighting that in the older ones BP was higher in women than in man compared to the younger, but in all the two populations BP falls after the age of 70. In the main part of his presentation, Prof. Farsang spoke about the relationship between age and hypertension, by highlighting that the prevalence of hypertension raises with the increase of age. The speaker talked also about the effects of menopause on blood

Prof. Farsang, coming from Budapest (HU), spoke about aging and its effects on the relationship between hypertension and gender, by presenting a huge amount of data on the blood pressure levels in man and women during the life, by highlighting that the results between studies are discordant. Going deeper in his lecture, the speaker presented very impressive



pressure and on the vasculature and presented very interesting data on the relationship between age, peripheral artery disease and cardiovascular disease. Finally, Prof. Farsang talked about the therapeutic aspects linked with hypertension and aging. In conclusion, the speaker pointed out that blood pressure increases with age till the 70th when starts to decrease both in women and in men.

Awareness, treatment, and control rates of hypertension, by sex in 2006 in the UK

Variable	2006:	
	men	women
Awareness of hypertension (%)	62	71*
Proportion treated (%)	47 ^b	62*
Control rates (%)	24	32*
Control rates (treated) (%)	52	53*

Falaschetti E et al. Hypertension. 2009.

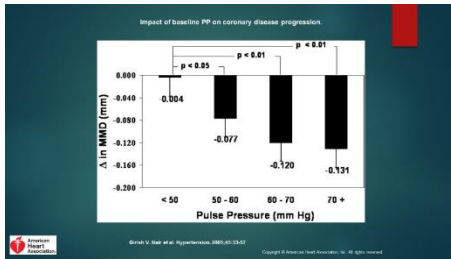
- What are the main factors that affects the control of hypertension from the speaker point of view?
- What's about age and the prevalence of hypertension in Albania, based on the data presented by the speaker?
- What's about the correlation between age and the peripheral artery disease based on the data presented by the speaker?
- What is the effect of menopause on the vasculature?
- What's about the relationship between age and the prevalence of hypertension in Hungary?

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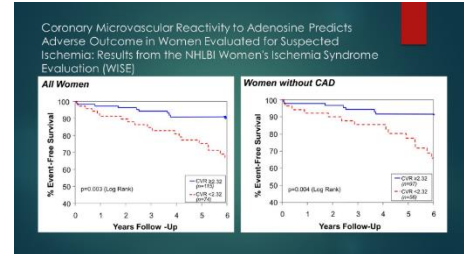
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Hypertension and ischaemic heart disease in women

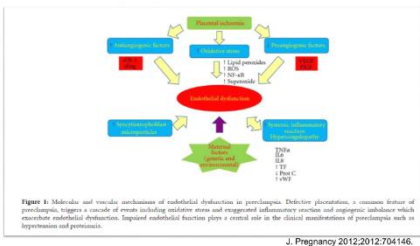


Hypertension and ischaemic heart disease in women, was the topic at the core of Prof. Dorobantu presentation. The speaker coming from Bucarest (RO), at the beginning of her presentation talked about the mechanisms of IHD in women and the differences between sexes. Going deeper in her lecture, Prof. Dorobantu spoke about the vascular remodelling in women

by highlighting that in postmenopausal women there are stiffer arteries than in men and this factor increases the risk of cardiovascular disease. In the main part of her lecture, the speaker presented very interesting data on the relationship between estrogens and the vascular inflammation



processes, leading to the onset of the coronary microvascular dysfunction in women and their related diseases like the hypertension during pregnancy or the polycystic ovarian syndrome. Finally, Prof. Dorobantu pointed out that even in absence of obstructive coronary disease, women with impaired coronary microcirculation have worse outcomes than those with normal microcirculation.



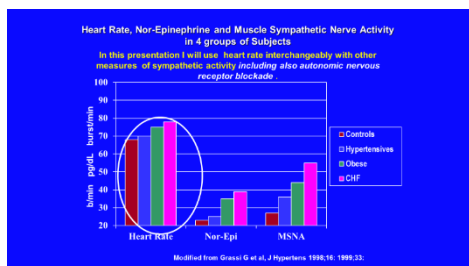
- What's about the sex differences in the atheroma burden and in the endothelial function in patients with early coronary atherosclerosis?
- What's about the polycystic ovarian syndrome based on the data presented by the speaker?
- What are the main mechanisms of IHD in women, based on the data presented by the speaker?
- What is the role of estrogens in the inflammation- induced endothelial dysfunction, based on the data presented by the speaker?

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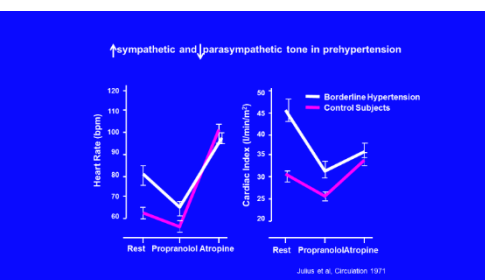
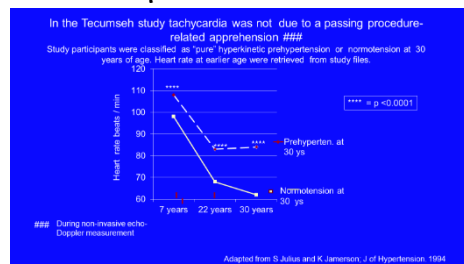
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Hypertension in young and old ages: similarities and differences



Hypertension in young and old ages: similarities and differences, was the topic Prof. Julius talked about. The speaker coming from Ann Arbor (USA), presented very interesting data on the sympathetic activity, by speaking about autonomic nervous receptor blockade, heart rate and other measures, with the aim to investigate if the presence of tachycardia is frequent or not in the

prehypertension people. Going deeper in his lecture, Prof. Julius talked about the results of the Tecumseh study and presented many data on the hyperkinetic state with the intention to define if this is a benign hemodynamic condition or whether it evolves into established hypertension. Speaking about the mechanisms that lead to the increase of the vascular resistances in the course of the hypertension state, Prof. Julius presented very interesting data demonstrating that these are



not receptor-related but linked with structural changes in the vasculature. Finally, the speaker talked about the relationship between the sympathetic tone and the state of established hypertension, by highlighting that the sympathetic and the parasympathetic tone have an opposite activity in pre-hypertensive and hypertensive patients, demonstrating a specific role played by the brain in achieving the goal BP.

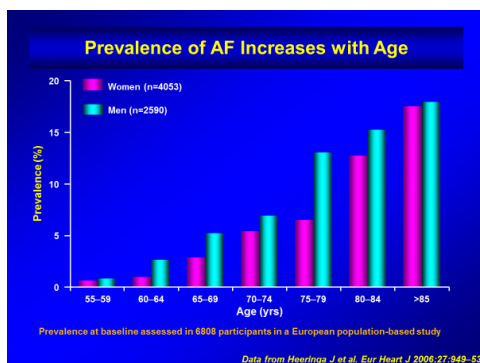
- Is the hyperkinetic state a benign hemodynamic condition or does it evolve into established hypertension?
- What are the main mechanisms of the decrease of cardiac output and the increase of the vascular resistance in the course of HT?
- What's about the BP seeking properties of the brain based on the data presented by the speaker?
- What are the main results of the Tecumseh study presented by the speaker?

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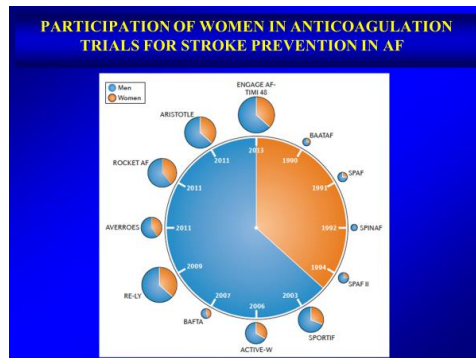
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Atrial fibrillation, age and gender



AF than men. Going deeper in his lecture, the speaker presented very interesting data on the recommendations for stroke prevention in AF patients. In the main part of his presentation Prof. Manolis talked about the relationship between the bleeding risk and the presence of AF, by highlighting that the older age is a non-modifiable bleeding risk factor.

Atrial fibrillation, age and gender, was the topic at the core of Prof. Manolis presentation. The speaker coming from Athens (GR), presented very interesting data on the risk factors leading to the onset of the Atrial fibrillation, by highlighting that age is one of the most important. Prof. Manolis, pointed out that AF is an independent risk factor for stroke at any age and women are at major risk for



Talking about the gender differences in presentation, treatment and outcomes in patients with AF, the speaker pointed out that the quality of life is worse in women than in men. From the treatment point of view, Prof. Manolis highlighted that the time in therapeutic range is lower in women and the residual risk of stroke is higher in women than in men. In conclusion, the speaker pointed out that it is mandatory to identify the main mechanisms explaining the sex differences in outcomes associated with the rhythm control strategies.

OVERVIEW OF TREATMENT ON AF IN WOMEN COMPARED WITH MEN

Rate/rhythm control	Stroke prevention
Similarities Utilization and outcomes of pharmacological cardioversion	Similarities • Warfarin and NOAC prescription • Risk of bleeding with warfarin • Efficacy of NOAC versus warfarin • Residual risk of stroke with NOAC • Risk of bleeding with NOAC versus warfarin
Differences • Rate control more common in women • Rhythm control might be associated with higher rates of adverse events in women • Electrical cardioversion might be less common and less successful in women • Catheter ablation might be less common in women and might be associated with greater risk of complication	Differences • Time in therapeutic range might be lower in women • Residual risk of stroke with warfarin higher in women • Dabigatran 110 mg prescribed more in women • Lower risk of bleeding with oral anticoagulant in women

- What are the main risk factors, clinical conditions and markers for the development of AF?
- What is the correlation between age and AF, based on the data presented by the speaker?
- What's about the gender differences in the risk of Ischemic Stroke and peripheral embolism in AF patients?
- What's about the bleeding risk assessment in AF patients, based on the data presented by the speaker?
- What's about the treatment of AF in women and men from the speaker point of view?
-

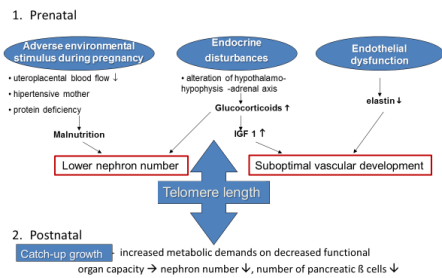
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Low birth weight and early vascular aging

IUGR and risk of hypertension – underlying mechanisms ?



relationship between intrauterine growth restriction and the risk of hypertension in the adult age. Going deeper in his talk, Prof. Laganović presented very interesting

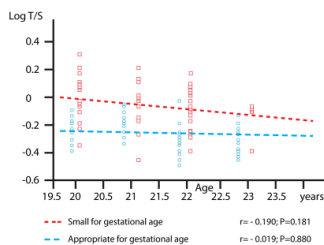
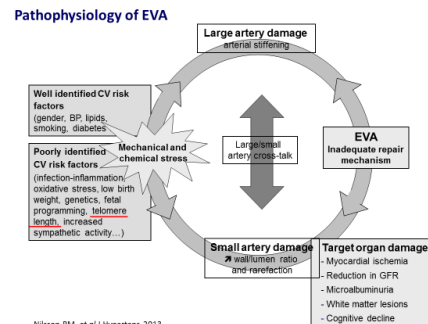


Figure 3. Negative correlations of telomere length (log T/S) with age

Laganović M et al. J Hypertens. 2014;32(8):1613

Prof. Laganović talked about the relationship between the low birth weight and the early vascular aging. The speaker coming from Zagreb (HR), at the beginning of his lecture, presented very interesting data on the main vascular changes in persons with suboptimal fetal development, by highlighting that there is a very tight



Nilsson PM, et al J Hypertens 2013

data on the evidence of the arterial narrowing in low-birth-weight patients and on the components of the early vascular aging syndrome. In the last part of his lecture, the speaker talked about the correlation between the intrauterine growth restriction and the accelerated telomere attrition by highlighting that no changes in telomere attrition have been detected till now, based on the published clinical data.

- What's about the impact of the birth weight on blood pressure and arterial stiffness in later life, based on the data presented by the speaker?
- What's about the relationship between different patterns of inadequate fetal development and the different influences on vascular structure and function?
- What's about the correlation between men born small for gestational age and the office blood pressure values, based on the data presented by the speaker?
- What are the main components of the early vascular aging syndrome presented by the speaker?

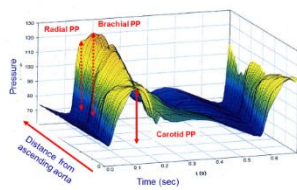
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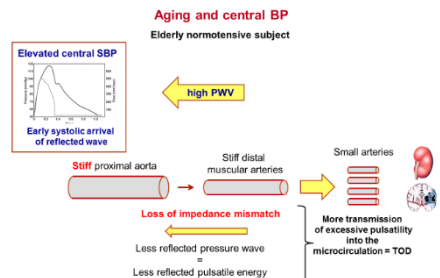
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Central blood pressure, age and gender

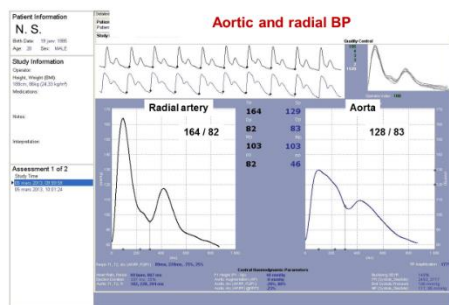
Amplification of SBP and PP from the ascending aorta to the brachial and radial arteries in a young subject
Parker K et al. 2004



Prof. Laurent talked about the relationship between central blood pressure age and gender. The speaker coming from Paris (FR), presented very interesting data on the correlation between central BP and peripheral BP, by highlighting the correlation between the central and the peripheral SBP in young people, leading to an amplification of SBP and PP from the ascending aorta to the brachial and the radial arteries. Going deeper in his lecture, Prof. Laurent presented very interesting data on the effect of aging on central BP leading to its raise. Prof. Laurent, presented also very interesting data on the differences between men and women in the central BP levels, where men have higher levels than women. In the second part of his presentation, the speaker talked about the predictive value



of the central BP for CV events, by highlighting that TOD has a higher correlation with the central than with the peripheral one, but the predictivity is the same. Finally, Prof. Laurent, presented very interesting data on Isolated Systolic Hypertension, by highlighting that these patients need lifestyle measures, but in the presence of target organ damage it is necessary to start with a pharmacological treatment.



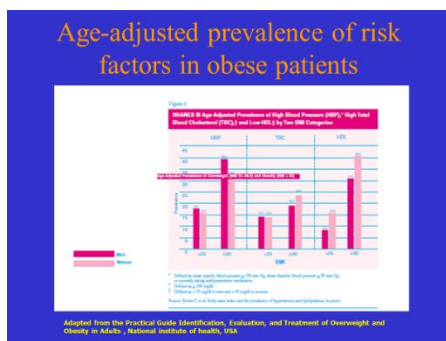
- Why is central SBP unable to predict CV events consistently more than brachial SBP?
- Why is central SBP higher in young men than in young women?
- What's about Isolated Systolic Hypertension in young people from the speaker point of view?
- What's about the correlation between Aging and central BP?

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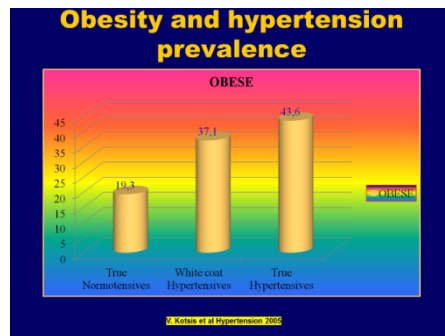
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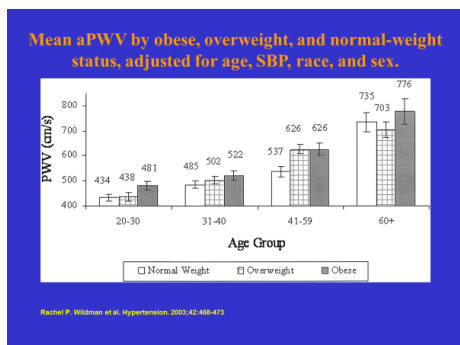
Obesity and early vascular aging



Obesity and early vascular aging was the topic Prof. Kostis talked about. The speaker coming from Thessaloniki (GR), presented very interesting data on the correlation between obesity, hypertension and target organ damage. Going deeper in his lecture, the speaker talked about the dipping status in obese patients compared to the non-obese and presented



very interesting data on the correlation between obesity and hypertension. In the main part of his presentation, Prof. Kostis talked about vascular aging and its correlation with obesity,



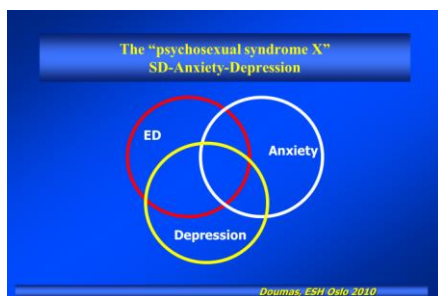
by highlighting that the arterial stiffness is one of the most important biomarkers of vascular ageing and that the obese patients through the reduction of the endothelial function, have an increased pulse wave velocity. Speaking about intima-media thickness and obesity, Prof. Kostis presented very interesting data on the possible mechanisms leading to this phenomenon.

- How can we define early vascular ageing from the PWV levels, based on the data presented by the speaker?
- What's about the increase of the intima-media thickness in obese patients from the speaker point of view?
- What's about the correlation between obesity and the carotid atherosclerosis?

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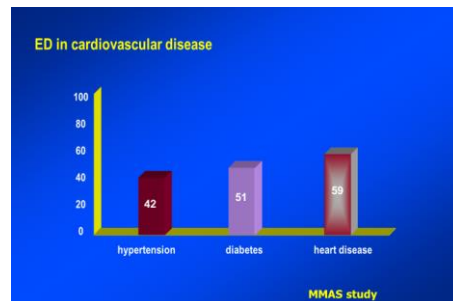
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Sexual function, aging and cardiovascular risk

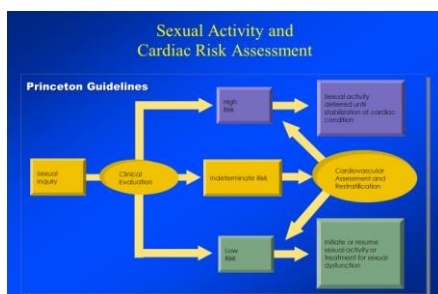


Prof. Doulmas talked about sexual function, aging and the cardiovascular risk. The speaker, coming from Thessaloniki (GR), presented very interesting data on the correlation between age and the Erectile dysfunction determinants, by highlighting the importance of many factors like the androgen decline with time, the onset of depression or anxiety and the presence

of vascular factors like the atheromatic lesions. Going deeper in his lecture, Prof. Doulmas presented very interesting data on the strong correlation between ED and cardiovascular diseases like coronary artery disease, stroke or MI. The speaker talked about the correlation between ED and the cause for all mortality. Finally, the speaker spoke about prevention and management by highlighting that it is mandatory to identify the asymptomatic CAD, to



manage in an appropriate way the erectile dysfunction also through the choice of the right drugs particularly in presence of hypertension and finally to provide an adequate sexual counselling. Finally the speaker talked about medical therapy, by highlighting the role played by the PDE-5 inhibitors. In conclusion, Prof. Doulmas pointed out that a well-balanced sexual activity significantly reduces the CV risk in men and women.



- What's about sexual activity and the cardiac risk assessment?
- What are the main topics of an appropriate management of the erectile dysfunction based on the data presented by the speaker?
- How to identify the asymptomatic CAD from the speaker point of view?
- What's about the correlation between ED and subsequent CVD in the general population based on the data presented by the speaker?
- What is the correlation between ED and type 2 diabetes based on the data presented by the speaker?

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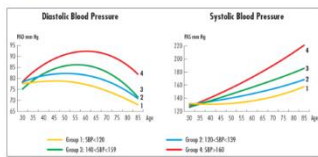
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Hypertension in the elderly: which drug(s)

Effects of aging on blood pressure

- SBP constantly rises with age
- DBP remains constant and even reduces after 60 y.
- In elderly population isolated systolic hypertension (ISH) is quite common

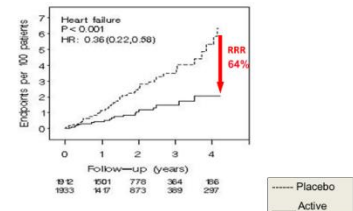


Franklin SS et al. Circulation. 1997;96:306-315.

more in particular on SBP more than on DBP. In the main part of his talk, the speaker presented very interesting data on the effect of treating hypertension in the elderly, pointing out the lack of efficacy in reducing the total mortality rate. More in particular Prof. Počanić talked about the results of the HYVET study where the treatment of very old

Hypertension in the elderly: which drug(s) was the topic discussed by Prof. Počanić. The speaker coming from Zagreb (HR), presented very interesting data on the correlation between the elderly and hypertension, by highlighting the tight relationship between aging and CV risk. Going deeper in his lecture, Prof. Počanić talked about the effects of aging on blood pressure and

HYVET results on HEART FAILURE



HYVET Study Group. Treatment of Hypertension in Patients 80 Years of Age or Older. *n engl j med* 358:1883-1892, 2008

Compelling and possible contra-indications to the use of antihypertensive drugs

Drug	Compelling	Possible
Thiazide diuretics	Gout	Metabolic syndrome, Glucose intolerance, Pregnancy, hypercalcaemia, β -blockers
Beta-blockers	Asthma A-V block (grade 2 or 3)	Metabolic syndrome, β -blockers, Athletes and physically active, Chronic obstructive pulmonary disease, or vasodilator beta-blockers
Calcium antagonists (dihydropyridines)		oedema, Heart failure
Calcium antagonists (verapamil, diltiazem)	A-V block (grade 2 or 3) Severe LV dysfunction Heart failure	
ACE inhibitors		Women with childbearing potential
Angiotensin II receptor antagonists	Hyperkalaemia Bilateral renal artery stenosis	Women with child bearing potential
Mineralocorticoid receptor antagonists	Pregnancy, hyperkalaemia Bilateral renal artery stenosis	
	Acute or severe renal failure (eGFR < 30 mL/min) Hyperkalaemia	

High age is not contra-indication for ANY antihypertensive therapy!!

hypertensive people produced a reduction of total mortality of about 21%. In the last part of his presentation, the speaker talked about the 2013 ESH/ESC guidelines recommendations in the elderly and more in particular about the drugs to be used, by highlighting that an old age is not a contra-indication for any anti-hypertensive therapy. In conclusion, Prof. Počanić pointed out that regardless therapy, the elderly need careful monitoring and dose titration.

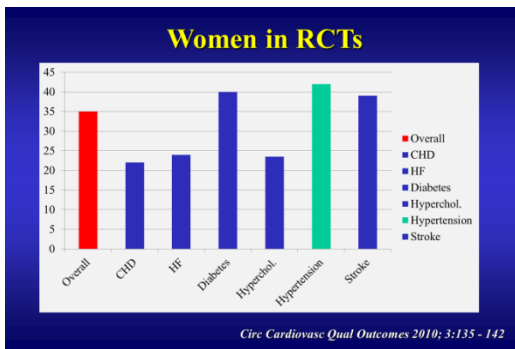
- What is the correlation between aging and CV risk?
- What's about the INDANA meta-analysis presented by the speaker?
- What are the HYVET results on total mortality, based on the data presented by the speaker?
- What's about the drugs to be preferred for the treatment of ISH?
- Should elderly patients with SBP between 140 and 160 mmHg be treated or not?

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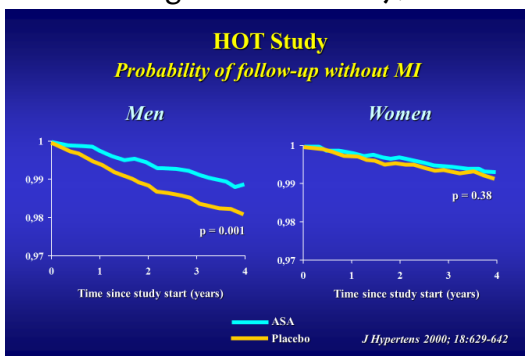
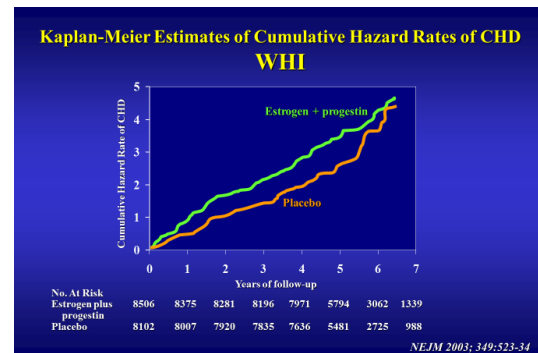
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Hypertension in women: which drug(s)



Prof. Cifkova talked about hypertension in women and the recommended drug therapy. The speaker coming from Prague (CZ), presented very interesting data on hypertension outside pregnancy and hypertension in pregnancy, by highlighting that the presence of women in the randomized clinical trials is not well represented if compared with that one of men. Going deeper in her

lecture, Prof. Cifkova talked about the main results given by the clinical randomized trials running in hypertensive women, by highlighting that HRT does not change the incidence of coronary events compared to placebo, leading to the need to suspend HRT therapy in post-menopausal women for the prevention of CVD. In the main part of her presentation, the speaker talked about the right drug therapy to be applied in women, more in particular during pregnancy and presented very interesting data on the more common adverse drugs effects. Finally, Prof. Cifkova talked about breast-feeding and the consequences



of the anti-hypertensive treatment on the baby, by highlighting that drugs are present in the breast milk but at very low concentrations and presented a list of drugs usually compatible with breast feeding. In conclusion, Prof. Cifkova pointed out that ACE-I, ARB and direct renin inhibitors should be avoided in pregnant women and in those ones with child-bearing potential.

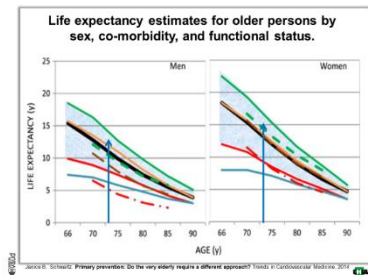
- Should hypertension be treated differently in men and women?
- What's about the drugs to be used in pregnancy for treating hypertension?
- What are the main effects of the β -blockers in the pregnant women on the birth weight?
- What's about the emergency management of hypertension in pregnancy based on the data presented by the speaker?
- What are the drugs compatible with breast feeding presented by the speaker?

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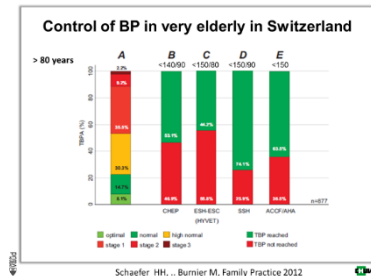
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How to improve blood pressure control in the elderly



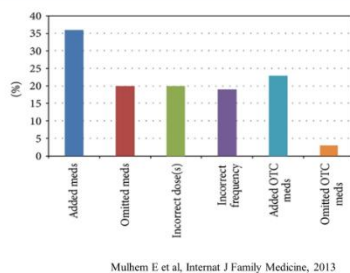
“How to improve blood pressure control in the elderly” was the topic Prof. Burnier talked about. The speaker coming from Lausanne (CH), presented very interesting data on the benefits of treating hypertension in the elderly, by highlighting that whatever is the basal BP level the benefit is the same. Going deeper in his lecture Prof. Bournier talked about the methods to be applied for improving the BP control in the elderly and



presented very interesting data given by a clinical study performed in Switzerland on the BP control in elderly people. The speaker pointed out that in order to improve the BP control in the elderly it is mandatory to correctly inform the GPs. Speaking about dementia, Prof. Bournier highlighted that high blood pressure is one of the major risk factor for the development of this disease. The speaker talked also about the relationship between the hypertension treatment and the risk of fall, by highlighting that the risk of fall is increased

more with the use of anti-depressant than with the anti-hypertensive drugs. Finally, Prof. Bournier presented very interesting data on adherence, by highlighting that this problem is divided into two points, characterized by under-adherence but also over-adherence. In conclusion, the speaker pointed out that in order to improve BP in the elderly, it is mandatory to work on patients but also on physicians for convincing them that lowering BP to targets is beneficial.

Adherence to therapy in elderly 24-48 h after hospitalisation



- How to control BP in the elderly?
- What's about the risk factors for falls in the elderly?
- What's about the problem of adherence to therapy in elderly people after the hospitalization, based on the data presented by the speaker?
- What are the main medication factors affecting adherence in elderly people, from the speaker point of view?

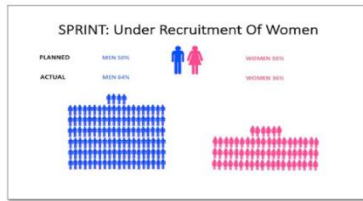
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How to improve blood pressure control in women

The representation of women in RCTs in hypertension is 44% but only 24% of all CV trials report sex-specific results

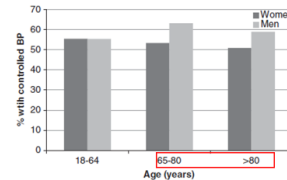


Nanette K. Wenger et al, *The American Journal of Medicine* doi 10.1016/j.amjmed.2016.06.022

women, by highlighting that there is a more pronounced age-related decline in BP control in women than in men. In the main part of his talk, the speaker presented very interesting data on the BP target in 2017 and the methods to be implemented for improving the BP control in women, starting from the proper BP measurements and to remove the causes which maintain high BP values. Prof. Tsioufus talked also about the drug-induced HT in women, by highlighting the role played

Prof. Tsioufus talked about the methods for improving the blood pressure control in women. The speaker coming from Athens (GR), presented very interesting data on the relationship between hypertension and the risk factors for CVDs in women. Going deeper in his lecture, Prof. Tsioufus talked about the hypertension control in

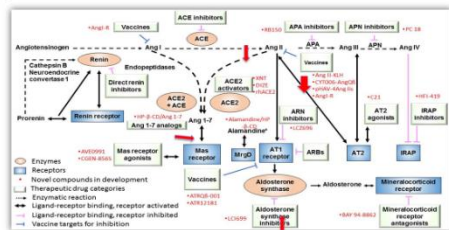
Women > 65 years had worse control rates than age-matched men



BP control rates as a function of age and gender

Keyhani S et al. *Hypertension* 2008;51:1149-1155

Will future antihypertensive drugs contribute in the better management of HTN?



R.Kretz, in: Tsioufus, Schmedler, Mancia: *Interventional therapies for essential and secondary hypertension*, Springer 2016

by the hormonal replacement therapy and the oral contraceptives. Finally, the speaker presented very interesting data on the main treatment strategies to be applied in hypertensive women characterized by pharmacological but also non-pharmacological interventions. In conclusion, Prof. Tsioufus pointed out that it is important to initiate the life style changes and only after, to select the appropriate combinations of anti-HTN drugs.

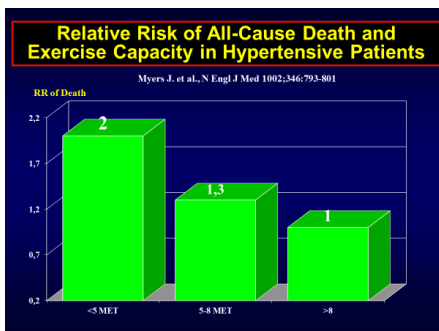
- What's about the number of men and women with hypertension in 2000 and 2025?
- Are we happy with the control of HTN in women?
- What are the BP targets in 2017, based on the data presented by the speaker?
- How to improve blood pressure control in women?
- What's about the pharmacological treatment of HTN in women ?

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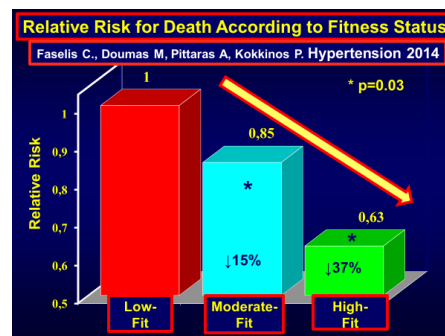
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Life style changes - focus on physical activity



Life style changes - focus on physical activity, was the topic Prof. Pittaras talked about. The speaker coming from Athens (GR), talked about physical exercise, by highlighting that exercise reduces the risk of diabetes, dyslipidemia, obesity and hypertension. Going deeper in his lecture, Prof. Pittaras presented very interesting data on the relationship between physical exercise and hypertension, by highlighting that exercise reduces the

blood pressure, the risk of mortality and prevents the onset of hypertension. In the main part on his talk, the speaker presented a huge amount of data demonstrating these effects not only in young/adult people but also in the elderly. Speaking about the levels of physical activity Prof. Pittaras presented very impressive data on the exercise-related health benefits at



For even greater health benefits adults should increase their activity to:

<ul style="list-style-type: none"> • Frequency: 5-6 days • Intensity: Moderate intensity • Time: 50-60 minutes • Type: Aerobic activity (i.e. brisk walking) 	OR	<ul style="list-style-type: none"> • Frequency: 5-6 days • Intensity: Vigorous intensity • Time: 25-30 minutes • Type: Aerobic activity (i.e. jogging or running)
AND		
<ul style="list-style-type: none"> • Muscle strengthening activities ≥ 2 days a week that work all major muscle groups. 		<ul style="list-style-type: none"> • Muscle strengthening activities on ≥ 2 days a week that work all major muscle groups.

any exercise level. In the last part of his presentation, the speaker talked about the type of exercise to be recommended for the hypertensive patients and about how intensive should be the physical activity. In conclusion, Prof. Pittaras pointed out that there are 1440 minutes in each day and it is sufficient to spend only 30 of these ones for doing something that is physically challenging.

- What are the training-induced hemodynamic changes, based on the data presented by the speaker?
- What's about the relationship between exercise capacity and mortality rate in hypertensive men with and without risk factors from the speaker point of view?
- What's about the exercise prescription for the hypertensive patients, based on the data presented by the speaker?
- What's about flexibility in exercises from the speaker point of view?

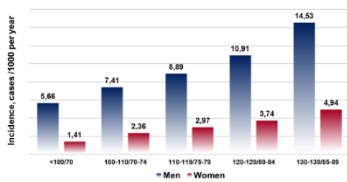
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Guidelines on treatment of hypertension in children and adolescents

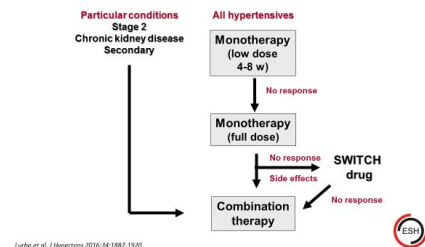
Incidence of hypertension according BP at 17 yr old grouped by gender



Tirosh A et al. Hypertension 2010;56:203-209

Prof. Lurbe talked about the guidelines on the treatment of hypertension in children and adolescents. The speaker coming from Valencia (ES), presented very interesting data on the time to treat hypertension in adolescents, by highlighting that the incidence of hypertension is about 7% per year. Going deeper in her presentation, Prof. Lurbe, talked about the progression of normotensive adolescents to hypertensive adults, by highlighting the huge difference in incidence between males and females. In the main part of her lecture, the speaker talked about the 2016 guidelines recommendations on the criteria to define hypertension-

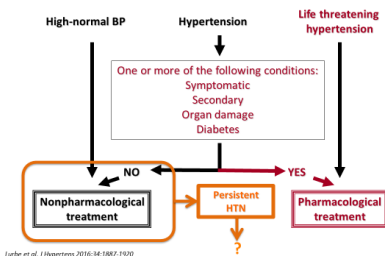
2016 Guidelines: How to initiate antihypertensive treatment



Lurbe et al. J Hypertens 2016;34:1887-1920

induced organ damage and on the time for starting the treatment. Finally, Prof. Lurbe spoke about treatment, starting from the life style changes to the need for medical therapy, by highlighting the paucity of evidences supporting the safety and the efficacy profile of the antihypertensive drugs in children and adolescents. In conclusion, Prof Lurbe, pointed out that the effects of the anti-hypertensive agents on the intermediate goals of the CV-renal disease needs to be deeply investigated.

ESH When to initiate antihypertensive treatment



Lurbe et al. J Hypertens 2016;34:1887-1920

- When to initiate the anti-hypertensive treatment in children and adolescents?
- What's about the criteria for defining the hypertension-induced organ damage in adolescents?
- What are the key points of the progression of normotensive adolescents to hypertensive adults presented by the speaker?
- What is the incidence of hypertension in adolescents, based on the data presented by the speaker?

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