The Differentiated Clinical Values of Valsartan for CV Disease Management

성균관의대 삼성서울병원 내과
박 승 우
Contents

- The aim of Hypertensive Therapy
- Management of Hypertension
- The Wealth of Clinical outcome ARB : Diovan
- The efficacy of High dose Diovan
The aim of Hypertensive Therapy
Hypertension is the Number One Risk Factor for Global Mortality

Attributable mortality in millions (total: 55,861,000)

- High BP
- Tobacco
- High cholesterol
- Underweight
- Unsafe sex
- High BMI
- Physical inactivity
- Alcohol

Ezzati et al. Lancet 2002;360:1347–60
Global Burden of Hypertension is Predicted to Increase In Spite of Treatment Advances

Pooled data from 30 population-based studies from around the world

From Hypertension to CHF and Death

Hypertension

Obesity
Diabetes

Smoking
Dyslipidemia

LVH

Diastolic Dysfunction

MI

Systolic Dysfunction

CHF

Death

Left Ventricular Remodeling

Subclinical Left Ventricular Dysfunction

Overt Heart Failure

Time, decades

Cardiovascular Mortality Risk Doubles With each 20/10 mmHg BP Increment*

Cardiovascular mortality risk

Systolic BP/Diastolic BP (mmHg)

115/75 135/85 155/95 175/105

1X risk 2X risk 4X risk 8X risk

*Individuals aged 40–69 years

Blood Pressure Reduction of 2 mmHg Decreases the Risk of Cardiovascular Events by 7–10%

- Meta-analysis of 61 prospective, observational studies
- 1 million adults
- 12.7 million person-years

Cardiovascular Risk of Hypertension is related to

- Level of Blood pressure
- Associated Cardiovascular risk factors
Long-term treatment for hypertension significantly reduces CV events....

Risk of CV event with ACEI or CCB relative to placebo

- CV event: 21–28%
- Stroke: 30–39%
- CHD: 20–21%

Relative risk reduction (%)
... But Even if Hypertension is Controlled Patients are at Increased Risk of Death and Coronary Heart Disease (CHD)

Overall survival

CHD deaths

Follow-up BP: NBP 145/93
T-HBP 145/89

p=0.0001

Andersson OK et al., 1998
Hypertension is complicated by high prevalence of metabolic disorders

>50% have two or more comorbidities

Aims of Hypertensive Therapy

• Reduce cardiovascular morbidity and mortality
  ✓ Cardiac
  ✓ Cerebrovascular

• Prevent or delay target-organ damage
  ✓ Heart
  ✓ Brain
  ✓ Kidney
Management of Hypertension
### ESH–ESC and JNC 7 Guidelines Recommendations for BP Goals

<table>
<thead>
<tr>
<th>Type of Hypertension</th>
<th>JNC 7&lt;sup&gt;1&lt;/sup&gt;</th>
<th>ESH-ESC&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncomplicated</td>
<td>&lt;140/90</td>
<td>130–139/80–85</td>
</tr>
<tr>
<td>Complicated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>&lt;130/80</td>
<td>130–139/80–85</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>&lt;130/80*</td>
<td>130–139/80–85</td>
</tr>
<tr>
<td>Other high risk (stroke, myocardial infarction)</td>
<td>&lt;130/80</td>
<td>130–139/80–85</td>
</tr>
</tbody>
</table>

*Lower if proteinuria is >1 g/day

Large Population of Patients Remain…
Undiagnosed, Diagnosed and not treated, Treated but uncontrolled

Total US hypertension\(^1\) patients: 41.9 m
\(^1\) Hypertension defined as 140/90 mmHg

Sources
Epidemiology Database, The Mattson Jack Group, Hypertension, latest Epidata updates
Decision Resources, Decision Base 7, Hypertension Report, Mar 2003
DataMonitor, Treatment Algorithms
Hypertension 3rd edition, Jul 20, 2002
BP is poorly controlled in Europe and North America

Uncontrolled hypertension\(^a\) (% of total population)

- USA
- Canada
- England
- Italy
- Germany
- Sweden
- Spain

\(^a\)140/90 mmHg

Wolf-Maier K et al. Hypertension 2004;43:10–7
The Majority of Patients* with Hypertension in Europe Remain Untreated

*Age adjusted; patients aged 35–64 years
Hypertension = 140/90 mmHg threshold

Approximately 70% of Patients* in Europe Who Receive Treatment Do Not Reach BP Goal#

Patients not achieving BP goal (%)

England: 60%
Germany: 70%
Italy: 72%
Sweden: 79%
Spain: 81%

*Treated for hypertension
#BP goal <140/90 mmHg

Prevalence of CVD is increasing in many countries

- CVD is increasing in prevalence in many regions of the world, particularly in developing countries and eastern Europe.\(^1\)
- In countries where mortality rates from coronary heart disease are falling, morbidity rates – particularly in older age groups appear to be rising.\(^2\)

Approximately 62% of Hypertensive Patients have not been controlled in Korea

<table>
<thead>
<tr>
<th>Management of Hypertension over 30 yrs old</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Unit: %)</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>HTN Pts(^1)</td>
</tr>
<tr>
<td>Diagnosed(^2)</td>
</tr>
<tr>
<td>Treated(^3)</td>
</tr>
<tr>
<td>Controlled(^4)</td>
</tr>
</tbody>
</table>

1) Definition of Hypertension: BP over 140 / 90mmHg, or taking anti-hypertensive, Over 30 yrs old
2) Diagnosis rate: Rate of having been diagnosed by medical doctors
3) Treatment rate: Ratio of taking Anti-Hypertensive everyday or more than 20 days per month
4) Control rate: Ratio of blood pressure below 140 / 90mmHg
Prevalence of Hypertension in Korea

One third of those who are over 30 have a HTN and the prevalence of hypertension looks steadily decreasing over 10 years.

Prevalence of Hypertension over 30 yrs old*

(Unit: %)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>30-39yr</th>
<th>40-49yr</th>
<th>50-59yr</th>
<th>60-69yr</th>
<th>70+yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>30</td>
<td>12</td>
<td>25</td>
<td>40</td>
<td>48</td>
<td>57</td>
</tr>
<tr>
<td>2001</td>
<td>29</td>
<td>10</td>
<td>21</td>
<td>36</td>
<td>54</td>
<td>59</td>
</tr>
<tr>
<td>2005</td>
<td>28</td>
<td>9</td>
<td>20</td>
<td>41</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>2007-2009</td>
<td>28</td>
<td>10</td>
<td>20</td>
<td>36</td>
<td>55</td>
<td>62</td>
</tr>
</tbody>
</table>

Definition of Hypertension*: BP over 140 / 90 mmHg, or taking anti-hypertensive, Over 30 yrs old

2009 Korea National Health & Nutrition Survey
Management of Hypertension
The younger HTN patients are, the poorer management of hypertension is shown

Management of Hypertension among HTN patients

1) Definition of Hypertension: BP over 140 / 90mmHg, or taking anti-hypertensive, Over 30 yrs old
2) Diagnosis rate : Rate of having been diagnosed by medical doctors
3) Treatment rate: Ratio of taking Anti-Hypertensive everyday or more than 20 days per month
4) Control rate: Ratio of blood pressure below 140 / 90mmHg
What is the Valsartan?
ARB: Mechanism of Action

Bradykinin → ACE inhibitor → ANGIOTENSIN I → ANGIOTENSIN II escape pathways

AT₂ RECEPTOR → Tissue regeneration
AT₁ RECEPTOR → Inhibitor of inappropriate cell proliferation

Angiotensin II effects:
- Vasoconstriction
- Vascular hypertrophy
- Endothelial dysfunction
- Atherosclerosis

ARB effects:
- Hypertension
- Stroke
- Heart failure
- MI
- Arrhythmia
- Death
- Renal failure

GFR:
- Proteinuria/albuminuria
- Glomerulosclerosis
- Aldosterone release
Cardiovascular Disease

Cardiovascular Disease Diagram

- ANGIOTENSIN II
- Coronary thrombosis
- Myocardial ischaemia
- Myocardial infarction
- Arrhythmia and loss of muscle
- Remodelling
- Ventricular dilatation
- Heart failure
- End-stage heart disease
- Sudden death

Risk factors:
- CAD
- Atherosclerosis
- LVH
- Risk factors (Hypertension, LDL, Diabetes mellitus, etc.)
ARB: How Does it Work?

• By binding to the AT$_1$ receptor, ARB prevents the binding of angiotensin II produced by the renin-angiotensin-aldosterone system (RAAS) thereby blocking:
  – Sodium reabsorption
  – Aldosterone release
  – Vasoconstriction
  – Activation of the sympathetic nervous system

all of which can increase blood pressure (BP)
ARB: Further Benefits

- ARB allows continued activation of the angiotensin II type 2 (AT$_2$) receptor, which is thought to counteract AT$_1$ receptor-mediated actions.

- ARB can inhibit the effects of circulating and tissue angiotensin II, resulting in more complete RAAS blockade than that seen with ACE inhibitors (ACE-Is).

- ARB is not associated with the dry cough seen with ACE inhibition because it does not interfere with the breakdown of bradykinin.
Angiotensin Receptor Blockers Have a Wealth of Outcomes Data


*Expected enrolment
‡Ongoing and completed randomized controlled trials with death or hard CV events as or part of the primary endpoint
¶Valid as of December 2009
## Valsartan has a Wealth of CV Outcomes Data

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Design</th>
<th>Primary Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VALUE</strong></td>
<td>15,245</td>
<td>High-risk patients w/ hypertension; Double-blind, randomized study vs. amlodipine</td>
<td>No difference in composite of cardiac mortality and morbidity (primary)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>23% ↓ new-onset diabetes</td>
</tr>
<tr>
<td><strong>VALIANT</strong></td>
<td>14,703</td>
<td>Post-myocardial infarction patients; Double-blind, randomized study vs. captopril and vs. captopril + Diovan</td>
<td>No difference vs. captopril in all-cause mortality (primary)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Diovan is as effective as standard of care)</td>
</tr>
<tr>
<td><strong>Val-HeFT</strong></td>
<td>5,010</td>
<td>Heart failure II–IV patients; Double-blind, randomized study vs. placebo</td>
<td>13% ↓ morbidity and mortality (primary)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↓ left ventricular remodeling</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↓ atrial fibrillation occurrence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↓ heart failure signs/symptoms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↓ heart failure hospitalization</td>
</tr>
<tr>
<td><strong>MARVAL</strong></td>
<td>332</td>
<td>Patients w/ T2D + microalbuminuria ± HTN; Multicenter, randomized, double-blind, active-controlled study vs. amlodipine</td>
<td>44% ↓ in UAER vs. baseline with Diovan vs. 8% with amlodipine</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15.4% between-group difference favoring Diovan in patients returning to normoalbuminuria</td>
</tr>
</tbody>
</table>

## Valsartan has a Wealth of CV Outcomes Data

<table>
<thead>
<tr>
<th>Study</th>
<th>Patients Description</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>JIKEI HEART</strong>&lt;sup&gt;7&lt;/sup&gt;</td>
<td>3,081 Japanese patients on conventional treatment for hypertension, coronary heart disease, heart failure or combination of these; Multicenter, randomized, controlled trial comparing addition of Diovan vs. non-ARB to conventional treatment</td>
<td>39% ↓ composite CV mortality and morbidity  &lt;br&gt; 40% ↓ Stroke/transient ischemic attack  &lt;br&gt; 47% ↓ Hospitalization for heart failure  &lt;br&gt; 65% ↓ Hospitalization for angina</td>
</tr>
<tr>
<td><strong>KYOTO HEART</strong>&lt;sup&gt;8&lt;/sup&gt;</td>
<td>3,031 Japanese patients on conventional treatment for hypertension and high CV risk; Multicentre PROBE trial comparing addition of Diovan vs non-ARB to conventional treatment</td>
<td>45% ↓ Composite CV mortality and morbidity  &lt;br&gt; 45% ↓ Stroke/transient ischemic attack (TIA)  &lt;br&gt; 49% ↓ Angina pectoris  &lt;br&gt; 33% ↓ New-onset diabetes</td>
</tr>
<tr>
<td><strong>NAGOYA study</strong>&lt;sup&gt;9&lt;/sup&gt;</td>
<td>1,150 Japanese patients with T2DM or IGT (Impaired Glucose Tolerance); Multicentre PROBE trial comparing addition of Diovan vs Amlodipine to conventional treatment</td>
<td>No difference in composite of cardiac mortality and morbidity (primary)  &lt;br&gt; 33% ↓ congestive heart failure</td>
</tr>
</tbody>
</table>

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Valsartan: Extensively Studied Across the CV Continuum


Includes over 50,000 patients*1–6

Risk factors
- Diabetes
- Hypertension
- Atherosclerosis and LVH

Myocardial infarction
- Ventricular Remodelling
- Ventricular Dilation

Heart Failure
- End-stage Heart Disease
- Death
## ARBs in CHF

<table>
<thead>
<tr>
<th></th>
<th>ELITE II</th>
<th>Val-HeFT</th>
<th>CHARM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Losartan 50 OD vs Captopril 25 tid</td>
<td>Valsartan 40-160 BID add on Standard Tx vs Standard Tx</td>
<td>Candesartan 8-32 OD add on Standard Tx vs Standard Tx</td>
</tr>
<tr>
<td>N</td>
<td>3,152</td>
<td>5,010</td>
<td>7,601</td>
</tr>
<tr>
<td>Primary endpoint</td>
<td>All-cause mortality: NS</td>
<td>All-cause mortality: NS</td>
<td>All-cause mortality: NS</td>
</tr>
<tr>
<td></td>
<td>“No Approved Indication”</td>
<td>“Approved Indication”</td>
<td>“Approved Indication”</td>
</tr>
<tr>
<td></td>
<td>All-cause M/M:</td>
<td></td>
<td>CV death or HF hospitalization:</td>
</tr>
<tr>
<td></td>
<td>- Overall population: ACEI+ARB = -13.2%</td>
<td></td>
<td>- CHARM Added: ACEI+ARB = -15%</td>
</tr>
<tr>
<td></td>
<td>- Subgroup w/o ACEI: ARB = -44.5%</td>
<td></td>
<td>- CHARM Alternative: ARB = -30%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- CHARM Preserved: NS</td>
</tr>
</tbody>
</table>

"Approved Indication"
<table>
<thead>
<tr>
<th>OPTIMAAL</th>
<th>VALIANT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Captopril vs. Losartan</strong></td>
<td><strong>Captopril vs. Valsartan vs. Combination</strong></td>
</tr>
<tr>
<td>N</td>
<td>5,477</td>
</tr>
<tr>
<td><strong>Primary endpoint:</strong> All-cause mortality</td>
<td></td>
</tr>
<tr>
<td>Captopril vs. Losartan</td>
<td>Valsartan vs. Captopril:</td>
</tr>
<tr>
<td>RR 1.13 (95% CI: 0.99 – 1.28)</td>
<td>HR = 1.00; P = 0.982</td>
</tr>
<tr>
<td>p = 0.069</td>
<td>Valsartan + Captopril vs. Captopril:</td>
</tr>
<tr>
<td></td>
<td>HR = 0.98; P = 0.726</td>
</tr>
<tr>
<td><strong>Conclusion</strong></td>
<td></td>
</tr>
<tr>
<td>Study revealed that losartan was not superior to captopril, and <em>losartan was not shown to be equivalent to captopril</em> “No Approved Indication”</td>
<td>Valsartan is as effective as a proven dose of captopril in reducing the risk of:</td>
</tr>
<tr>
<td></td>
<td>- Death</td>
</tr>
<tr>
<td></td>
<td>- CV death or nonfatal MI or heart failure admission</td>
</tr>
<tr>
<td></td>
<td>“Approved Indication”</td>
</tr>
</tbody>
</table>
Valsartan(Diovan®): Who is it Intended For?*

• Valsartan is indicated for use in patients with:
  – Hypertension (with or without other antihypertensive agents)
  – Post-myocardial infarction (MI) (to improve survival after MI in clinically stable patients with signs, symptoms or radiological evidence of left ventricular failure and/or with left ventricular systolic dysfunction [LVSD])
  – Heart failure (HF) (patients receiving usual therapy such as diuretics, digitalis and either ACE-Is or beta-blockers but not both)

• Co-Diovan (Diovan + hydrochlorothiazide [HCTZ]) is indicated for use in:
  – Hypertension (with inadequate BP control by monotherapy) as second-line therapy

*Licensed indications
The efficacy of High-dose Valsartan
High dose of valsartan provides more BP reduction in mild-to-moderate Hypertensive patients

Results from a 8-week study in 3776 patients with mild-to-moderate HTN patients (ValTop study)

-4~0-week open-label treatment with Diovan 160mg.(MSDBP : 90~109mmHg)
0~4-week double-blind treatment with either 160 or 320mg Diovan.

#ITT population, *p<0.0001 vs. Diovan 160mg group

Parati et al. Hypertension reseach 2010;33:986-994
High-dose valsartan in Monotherapy is both safe and effective in mild-to-moderate uncomplicated hypertensive patients over relatively long periods of time.

Results from an 28-week extension study in 642 patients with valsartan 320mg (ValTop study)

Median change in BP from week 4 (mmHg)

△7.1mmHg

△3.7mmHg

Extension study: 28-week open-label treatment with Diovan 320mg after core trial (total 8-week; 4-week open-label Diovan 160mg, 4-week double-blind 160mg vs 320mg treatment)

Parati et al. Hypertension research 2010;33:986-994
Diovan and Co-Diovan Provide Rapid and Powerful Median BP Reductions

Results from a 12-week study in 1615 patients with stage 2 hypertension# (Val-MARC study)

<table>
<thead>
<tr>
<th></th>
<th>Week 2</th>
<th></th>
<th>Week 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SBP</td>
<td>DBP</td>
<td>SBP</td>
</tr>
<tr>
<td>Diovan 160 mg titrated to 320 mg after 2 weeks (n=807)</td>
<td>-14</td>
<td>-12*</td>
<td>-18</td>
</tr>
<tr>
<td>Co-Diovan 160/12.5 mg titrated to 320/12.5 mg after 2 weeks (n=808)</td>
<td>-21*</td>
<td>-9</td>
<td>-25*</td>
</tr>
</tbody>
</table>

#ITT population, SBP/DBP ≥160/100 and BP >185/109 mmHg were excluded; *p<0.001 vs. monotherapy

Ridker et al. Hypertension 2006;48(1):73-79
Diovan and Co-Diovan as Initial Therapy Effectively Reduces SBP Across Age and Race

Results from a 12-week study (6-week subgroup analysis) in patients with stage 2 HTN# (Val-MARC study subgroup analysis)

- White
- Black
- Hispanic
- <65 years
- ≥65 years

<table>
<thead>
<tr>
<th>Group</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>&lt;65 years</th>
<th>≥65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>567</td>
<td>190</td>
<td>58</td>
<td>733</td>
<td>103</td>
</tr>
<tr>
<td>n</td>
<td>562</td>
<td>202</td>
<td>51</td>
<td>715</td>
<td>117</td>
</tr>
</tbody>
</table>

Mean change in SBP at 6 weeks (mmHg)

- **Diovan 320 mg od†**
- **Co-Diovan 320/12.5 mg od†**

*1668 patients with SBP ≥160 mmHg and/or DBP ≥100 mmHg; †Diovan 160 mg od or Co-Diovan 160/12.5 mg; force-titrated to 320 mg or 320/12.5 mg od after 2 weeks; HCTZ 12.5 mg add-on to either regimen after 6 weeks for further BP control; *p≤0.01 vs. Diovan; HTN=Hypertension; SBP=Systolic blood pressure; Everett et al. Clin Ther 2008;30:661-72
High-dose Valsartan Produces Additional BP Control and Renal Protection

Results from a 30-week study in 391 patients with hypertension#, proteinuria and type 2 diabetes mellitus (DROP study)

Hollenberg et al. presented at American Heart Association Meeting 2006
Proportion of Patients who Achieved BP Goal of <130/80 mmHg by Week 30

Results from a 30-week study in 391 patients with hypertension#, proteinuria and type 2 diabetes mellitus (DROP study)

Hollenberg et al. presented at American Heart Association Meeting 2006
Valsartan doses provide effective SBP/DBP control over 24 Hours

Results from a 8-week study in 216 outpatients† with uncomplicated hypertension#

Mean ambulatory change in BP vs. placebo over 24 hrs (mmHg)

<table>
<thead>
<tr>
<th>Dose</th>
<th>SBP</th>
<th>DBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diovan 20 mg (n=44)</td>
<td>-5.9**</td>
<td>-3.5**</td>
</tr>
<tr>
<td>Diovan 80 mg (n=44)</td>
<td>-11.0*</td>
<td>-6.6*</td>
</tr>
<tr>
<td>Diovan 160 mg (n=41)</td>
<td>-10.6*</td>
<td>-5.5*</td>
</tr>
<tr>
<td>Diovan 320 mg (n=45)</td>
<td>-14.3*</td>
<td>-8.4*</td>
</tr>
</tbody>
</table>

†ITT population; #DBP ≥95 and ≤115 mmHg; *p<0.001 vs. placebo; **p=0.010 for DBP, p=0.008 for SBP vs. placebo

Diovan and Co-Diovan Provide Powerful 24-Hour BP Control in Patients with HTN

Results from a 12-week ABPM study in patients with mild-to moderate HTN

#329 patients with DBP ≥95 mmHg and <110 mmHg; §Diovan 160 mg; force-titrated after 4 weeks to Diovan 320 mg and to Co-Diovan 320/12.5 mg after 8 weeks; ABPM=Ambulatory blood pressure monitoring; BP=Blood pressure; DBP=Diastolic blood pressure; HTN=Hypertension; SBP=Systolic blood pressure; Zappe et al. ESH 2007 (Poster)
Co-Diovan provides effective BP reductions in Non-responders to Diovan monotherapy

Results from a 12-week study in patients with untreated mild-to-moderate essential HTN

- Change in MSSBP from baseline (mmHg)†
  - Co-Diovan 320/25 mg (n=900)
    - -21.9*  
  - Co-Diovan 320/12.5 mg (n=903)
    - -20.2*  
  - Diovan 320 mg (n=899)
    - -12.8

- Change in MSDBP from baseline (mmHg)‡
  - Co-Diovan 320/25 mg (n=900)
    - -14.2*  
  - Co-Diovan 320/12.5 mg (n=903)
    - -13.6*  
  - Diovan 320 mg (n=899)
    - -9.7

#3805 patients with MSDBP ≥90 and <110 mmHg; †Baseline MSSBP=159.9 mmHg in Co-Diovan 320/25 group, 160.0 mmHg in Co-Diovan 320/12.5 group and 159.4 mmHg in Diovan group; ‡Baseline MSDBP=100.3 mmHg in Co-Diovan 320/25 group, 100.6 mmHg in Co-Diovan 320/12.5 group and 100.5 mmHg in Diovan group; *p<0.0001 vs. Diovan 320 mg; §p<0.05 vs. Co-Diovan 320/12.5 mg; HTN=Hypertension; MSDBP=Mean sitting diastolic blood pressure; MSSBP=Mean sitting systolic blood pressure; Tuomilehto et al. Blood Pressure 2008;17:15-23
Co-Diovan 320/25 mg achieves BP goal in up to 9 out of 10 patients with stage 1 HTN

Results from a pooled analysis of 9 randomized trials in patients with HTN

$\text{Patients with stage 1 HTN achieving BP goal <140/90 mmHg} (\%)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Patients Achieving BP Goal &lt;140/90 mmHg (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-Diovan 320/25 mg (n=80)</td>
<td>80</td>
</tr>
<tr>
<td>Co-Diovan 320/12.5 mg (n=87)</td>
<td>80</td>
</tr>
<tr>
<td>Diovan 320 mg (n=271)</td>
<td>60</td>
</tr>
<tr>
<td>Co-Diovan 160/25 mg (n=35)</td>
<td>80</td>
</tr>
</tbody>
</table>

$\text{#Pooled analysis of 9 double-blind, randomized, placebo-controlled studies of 4-8-week duration with 2-4-week placebo run-in periods, the analysis included a placebo arm, Diovan 80 and 160 mg arms, and Co-Diovan 80/12.5 and 120/12.5 mg arms (data not shown);} $4278 \text{ patients with DBP \geq 95 and \leq 115 mmHg; BP=Blood pressure; DBP=Diastolic blood pressure; HTN=Hypertension;} $\text{Weir et al.}$

Diovan and Co-Diovan high doses rapidly achieve BP Goal in more patients

Results from a pooled analysis of 9 randomized trials in patients with HTN

- Co-Diovan 320/12.5-25 mg (n=335)
- Co-Diovan 160/12.5-25 mg (n=355)
- Diovan 320 mg (n=646)
- Co-Diovan 80/12.5 mg (n=96)
- Diovan 160 mg (n=907)
- Diovan 80 mg (n=781)
- Placebo (n=1,156)

#Pooled analysis of 9 double-blind, randomized, placebo-controlled studies of 4-8-week duration with 2-4-week placebo run-in periods; §4278 patients with DBP ≥95 and ≤115 mmHg; BP=Blood pressure; DBP=Diastolic blood pressure; HTN=Hypertension; Weir et al. Am J Hypertens 2007;20:807-15
Co-Diovan provides high control rates in patients with metabolic syndrome

Results from a 16-week study in pre-diabetic patients with HTN, obesity and metabolic syndrome# (MADE-ITT study)

- **BP goal <140/90 mmHg**
  - Co-Diovan 320/25 mg (n=187): 84**
  - Diovan 320 mg (n=189): 74
  - HCTZ 25 mg (n=190): 72

- **BP goal <130/80 mmHg**
  - Co-Diovan 320/25 mg (n=187): 50***
  - Diovan 320 mg (n=189): 32*
  - HCTZ 25 mg (n=190): 20

#566 patients with HTN (MSSBP ≥130 and ≤160 mmHg, MSDBP ≥85 and ≤100 mmHg), obesity (waist circumference >40 inches for males and >35 inches for females) and metabolic syndrome (fasting plasma glucose 100-125 mg/dL, or serum triglycerides >150 mg/dL, or serum HDL cholesterol <40 mg/dL in males or <50 mg/dL in females); *p=0.0017, **p=0.002 and ***p<0.0001 vs. HCTZ; BP=Blood pressure; HTN=Hypertension; MSDBP=Mean sitting diastolic blood pressure; MSSBP=Mean sitting systolic blood pressure; Zappe et al. J Clin Hypertens 2008;10:894-903
Co-Diovan provides incremental BP reductions in African Americans on high salt diet

Results from a 16-week study in 88 African Americans with hypertension

Incremental change in BP† (mmHg)

-12  -10  -8  -6  -4  -2  0  2  4

Diovan 320 mg (n=28)  Co-Diovan 160/12.5 mg (n=30)  Diovan 160 mg + Benazepril 20 mg (n=30)

-3.8  -3.3  -10.5*  -6.9*  2.4  -1.7

#DBP 95-114 mmHg; †Incremental to 4-weeks Diovan 160 and 200 mEq Na+/day; *p<0.05 vs. Diovan 160 mg + Na+ 200 mEq/day (high salt diet)  Weir et al. Am J Hypertens 2001;14:665-671
Co-Diovan 320/25 produces additional BP reductions compared to lower doses of Diovan(/HCTZ)

Results from an 8-week study in 1346 patients with essential hypertension#

#Mean sitting DBP ≥95 and <110 mmHg; *p<0.0001 compared with placebo and respective monotherapy component; **p=0.0017 vs. 160/12.5 mg

Mean change in BP from baseline to 8 weeks (mmHg)

-5.9 -7.0 -13.7 -11.3 -21.7 -15.0 -24.7 -16.6

Diovan 320 mg n=166
Co-Diovan 320/12.5 mg n=168
Co-Diovan 320/25 mg n=167

Co-Diovan reduces 24-Hour ambulatory BP more effectively than Amlodipine/HCTZ

Results from a 10-week study in patients with stage 2 HTN\# (EVALUATE study)

Approximate mean time in clock hour

Reduction in ambulatory BP from baseline at week 10 endpoint (mmHg)

\#482 patients with MSSBP ≥160 mmHg and <200 mmHg; MSDBP <120 mmHg; \$Diovan 160 mg or amlodipine 5 mg; force-titrated after 2 weeks to Co-Diovan 160/12.5 mg or amlodipine 10 mg and after 4 weeks to Co-Diovan 320/25 mg or amlodipine/HCTZ 10/25 mg; BP=Blood pressure; DBP=Diastolic blood pressure; HTN=Hypertension; SBP=Systolic blood pressure;

Lacourciere et al. ESH 2008 (Poster)
Summary

- Valsartan has a wealth of CV outcomes data across the Cardiovascular Continuum 1-6

- Valsartan is indicated for use in patients with hypertension, Post-myocardial infarction (MI), Heart failure (HF) 7

- High-dose Valsartan in monotherapy is both safe and effective in mild-to-moderate uncomplicated hypertensive patients over relatively long periods of time 8

- High-dose Valsartan provide not only rapid and powerful median BP reductions but also additional BP control and renal protection 9-11

- Valsartan doses provide effective SBP/DBP control over 24 Hours12

경청해주셔서 감사합니다.