Use of Beta-blocker Monotherapy in Hypertension: 
Situation in a Local General Outpatient Clinic

Dr. Dao Man Chi
Resident
Department of Family Medicine and Primary Health Care, KWC
HA Convention 2014
Introduction

- Beta-blockers (BB) have been used for >40 years
- Diverse class with different effects

**Beta-blockers**

**Non-vasodilating BB**
- Atenolol
- Metoprolol
- Propranolol

**Vasodilating BB**
- Carvedilol
- Labetalol
- Nebivolol
International Guidelines

- BB alone in treating uncomplicated hypertension is NOT recommended
International Guidelines

- BB alone in treating uncomplicated hypertension is NOT recommended

Principles of Hypertension Treatment
- Target systolic blood pressure is $\leq 140$ mmHg in patients aged 55 to 79
- Target systolic blood pressure is $\leq 140$ mmHg in patients $\geq$ aged 80+
- Achieved values $<140$ mmHg for those aged $\leq 79$ are appropriate; but for those aged $\geq 80$, 140 to 145 mmHg, if tolerated, can be acceptable.

- Lifestyle Modifications
- Not at Target Blood Pressure
- Initial Drug Choices

Without Compelling Indications
- Stage 1 Hypertension: SBP 140 to 159 mmHg or DBP 90 to 99 mmHg
- Stage 2 Hypertension: SBP $\geq 160$ mmHg or DBP $\geq 100$ mmHg

With Compelling Indications
- Compelling Indication
- Initial Therapy Options

ACEi, ARB, CA, diuretic, or combination
BB alone in treating uncomplicated hypertension is NOT recommended.
Local Guideline

Treatment algorithm

Drug treatment for essential HT

Compelling indication / contraindication over choice of drug

- Yes
  - Go to Appendix 1
- No
  - Start with either ACEI (or ARB if ACEI intolerant), calcium channel blocker or thiazide-type diuretic
    - No response or not tolerated, switch to another drug
    - Inadequate response but tolerated, add a second drug from different class
    - If blood pressure goal is still not reached, increase dose or consider adding third drug from different class
    - Refer to specialist if blood pressure still not under control
Trend of Anti-hypertensive Use in Hong Kong

Figures: Percentage of prescription episodes

Trend of Anti-hypertensive Use in CSW GOPC

Figures: Percentage of HT-only patients (excluding those had DM)
Aim of Audit

**Observation:**
- HT patients on BB as a sole anti-hypertensive agent despite the recommendation from clinical practice guideline

**Objective:**
- To determine the “appropriateness” of using BB monotherapy in HT patients
- To look for factors that affect the doctors’ choice of anti-hypertensives
Define “Appropriateness”

Any one of the following:

1. **Intolerance** (or **contraindication**) to 2 or more classes of anti-hypertensives (ACEi/ARB; CCB; Diuretics)

2. **BB use justified with compelling indication**: Prior myocardial infarction, angina, tachyarrhythmia, palpitation, heart failure, migraine, anxiety disorders etc

- Standard: 70%
Methodology

- Retrospective review

Data Collection:
- HT patients receiving BB as monotherapy in Cheung Sha Wan GOPC retrieved through CDARS
- Random patients selected for detailed review
  - Case notes, laboratory data and medication history
  - Determine reasons for initiating BB, any compelling indications and anti-hypertensive intolerance
Results

616 patients

Randomization

320 (52%)

60 excluded

Exclusion Criteria:
1. No recent blood tests (within 15 months)
2. Concurrent use of other anti-HT
3. Less than 3 regular follow-up in our clinic
Atenolol vs Metoprolol

Male

Female
Appropriateness

72%  
n=187

28%  
n=73

Appropriate

Inappropriate
Appropriateness

70.6% had 1+ metabolic derangements

28% n=73

NO metabolic derangements n=55

IFG + Lipid

DM + Lipid

Lipid

DM

IFG
Reasons for Low Appropriateness

- Concept of “Therapeutic Inertia”
  - Failure of healthcare providers to initiate to intensify therapy when indicated
  - Recognition of the problem, but failure to act

- Small clinic-level survey
Clinician Factors

- Increase in complexity of patient – time factor
  - *Service development – RAMP/FMSC
- Unawareness of latest guidelines
  - *Education courses/seminars
- Record keeping (reasons for initiating BB)
  - *Clinical notes audit, reminder system
- No laboratory tests needed for monitoring

*Proposed Strategies
Patient and Clinic Factors

- Reluctant to change
- Insufficient knowledge for change
  * Education by doctor/nurse
- Convenient dosing of BB
  * Use other anti-hypertensives with daily dose
- Perceived side-effects less than other classes

- Atenolol is cheapest among all antihypertensives
The Way Forward

- Larger scale research on appropriateness of BB use
- Identification of barriers – Patient factors
- Effective strategies for therapeutic inertia (especially those already on BB but not clinically indicated)
Conclusion

✿ Service gap identified
  ✿ Inappropriate use of BB may lead to suboptimal glycemic and lipid control

✿ Increase in clinicians’ awareness when prescribing BB for uncomplicated HT
  *(especially when repeating prescriptions)*
Acknowledgement

- Dr. Tsui Hoi Yee
- Dr. Yiu Ming Pong
- Dr. Luk Wan
- Dr. Yiu Yuk Kwan
Thank You!
BACKUP SLIDES FOR Q&A
Evidence: Non-Vasodilating BB

- Decrease in insulin sensitivity by 14-33%
- Increase in glucose concentration with the use of atenolol or metoprolol alone
- Increased 28% risk of development of DM in HT patients (ARIC study)
- Atenolol-based therapy was predictive for the development of DM, also resulted in worse clinical outcome in CV mortality, all-cause mortality and development of DM compared to amlodipine (ASCOT-BPLA)
- Majority of clinical studies indicate non-vasodilating BB tend towards having a negative effect on lipid parameters, especially TG and HDL
Patient Identification

- 616 patients identified using CDARS
  - Patients received atenolol or metoprolol without other classes of antihypertensive were included
  - Attendance date: 1/6/2013-30/9/2013
    - Rationale: Maximum follow-up period in GOPC: 12-14 weeks
    - Patient will receive at least 1 consultation within the 4-month period

- Exclusion Criteria
  - No recent blood tests within 15 months (some delay of ordering investigation to actual blood taking anticipated)
  - Concurrent use of other SFI antihypertensives not recognized by CDARS
  - Less than 3 follow-up episodes (exclude those FU case in other clinics or SOPD)
## CSW GOPC Patient Headcounts

<table>
<thead>
<tr>
<th>Year</th>
<th>BB</th>
<th>CCB</th>
<th>ACEi</th>
<th>Diuretics</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>972 (21%)</td>
<td>791 (17%)</td>
<td>155 (3%)</td>
<td>466 (10%)</td>
<td>4543</td>
</tr>
<tr>
<td>2007</td>
<td>961 (21%)</td>
<td>848 (18%)</td>
<td>184 (4%)</td>
<td>446 (10%)</td>
<td>4652</td>
</tr>
<tr>
<td>2008</td>
<td>902 (19%)</td>
<td>910 (19%)</td>
<td>234 (5%)</td>
<td>421 (9%)</td>
<td>4691</td>
</tr>
<tr>
<td>2009</td>
<td>774 (16%)</td>
<td>1163 (24%)</td>
<td>255 (5%)</td>
<td>343 (7%)</td>
<td>4790</td>
</tr>
<tr>
<td>2010</td>
<td>657 (14%)</td>
<td>1299 (27%)</td>
<td>278 (6%)</td>
<td>277 (6%)</td>
<td>4795</td>
</tr>
<tr>
<td>2011</td>
<td>567 (12%)</td>
<td>1472 (31%)</td>
<td>261 (6%)</td>
<td>230 (5%)</td>
<td>4733</td>
</tr>
<tr>
<td>2012</td>
<td>534 (11%)</td>
<td>1613 (34%)</td>
<td>245 (5%)</td>
<td>201 (4%)</td>
<td>4738</td>
</tr>
<tr>
<td>2013</td>
<td>505 (10%)</td>
<td>1870 (38%)</td>
<td>269 (5%)</td>
<td>179 (4%)</td>
<td>4953</td>
</tr>
</tbody>
</table>
## Medication Cost

<table>
<thead>
<tr>
<th>Medications</th>
<th>Daily Cost (as at 31.3.2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atenolol 50mg daily</td>
<td>$0.0570</td>
</tr>
<tr>
<td>Metoprolol 50mg BD</td>
<td>$0.1952</td>
</tr>
<tr>
<td>Norvasc 5mg daily</td>
<td>$0.1282</td>
</tr>
<tr>
<td>Adalat Retard 20mg BD</td>
<td>$0.2466</td>
</tr>
<tr>
<td>Zestril 10mg daily</td>
<td>$0.1282</td>
</tr>
<tr>
<td>Enalapril 10mg daily</td>
<td>$0.1798</td>
</tr>
<tr>
<td>Valsartan 80mg daily</td>
<td>$1.2623</td>
</tr>
<tr>
<td>HCTZ 50mg daily</td>
<td>$0.1588</td>
</tr>
<tr>
<td>Indapamide 2.5mg daily</td>
<td>$0.1870</td>
</tr>
<tr>
<td>Moduretic 1 tab daily</td>
<td>$0.1645</td>
</tr>
</tbody>
</table>
Appropriateness by Year

Year of Initiation of BB

N

0% 10% 20% 30% 40% 50% 60%

0 5 10 15 20 25 30 35

Questionnaire Survey

- 7 doctors in our clinic participated
- Most doctors use JNC7 (2003) for reference when prescribing antihypertensives (86%)
- All doctors unanimously choose CCB, ACEi/ARB and thiazide diuretics as their 1st, 2nd and 3rd choices of drugs for patients with newly diagnosed uncomplicated HT respectively
- For self-rated knowledge to various hypertension guidelines, most doctors rated “average” or below to most up-to-date international and local guidelines
Perceived Barriers

Top reasons for difficulty to adhere to clinical guidelines:

- Insufficient time to discuss with patients (86%)
- Insufficient time to find out the reasons why they were first initiated BB in clinical records (71%)
- Inertia to change the anti-hypertensives when patients did not have any complaints (71%)
- Expected difficulty to explain the rationale for changing drugs to patients (43%)