Side effects and treatments of asthma | case study

According to the Scottish Intercollegiate Guidelines Network (SIGN), Ms V was on step 2 in the management of chronic asthma. She was on MDI Salbutamol 2 puffs when required and MDI Budesonide 200 mcg BD. However, her asthma was not well controlled by the medication and causes the exacerbation of bronchial asthma. When she was admitted to the hospital, she was alert, conscious and able to speak in a full sentence. Her respiratory rate was 24 (<25) breaths per minute and her pulse rate was 80 (<110) beats per minute. Her arterial oxygen saturation was 100% (≥92%). Again, according to the SIGN, Ms V was having moderate acute asthma attack and she needs to be treated accordingly. Based on her condition, Ms V could actually be treated at home or in the emergency department if her initial PEV is more than 75%. She needs to be given her usual inhaled bronchodilators from a MDI. She could be discharged if she's stable and her PEV is still more than 75% when observed after 60 minutes12. However, the initial PEV alone could not be used to predict whether the patient is in the need for hospitalisation11. During admission, patient present with headache and giddiness, and her potassium level was slightly lower than normal range. This indicates the sign of salbutamol toxicity. Her overall asthma condition is poorly controlled and need to be manage properly before she could be discharged.

Treatment goal for acute exacerbation of asthma is to maintain patient's arterial saturation oxygen (SpO2) at a sufficient amount (94 – 98%) if patient's SpO2 less than 92% by giving a oxygen supply. Patient was given oxygen 3 L/min through a nasal prongs. If patient has a difficulty of breathing, there is a need for administration of rapid-acting inhaled

bronchodilator for relieving the condition. By administration of corticosteroid, we are hoping that the inflammation of air passageway could be reduced and relapse could be prevented. In the case of this AEBA, patient has been given AVN nebuliser which consist for ipratropium bromide and salbutamol at emergency department and tablet prednisolone 30 mg. According to the randomised double-blind trial between asthma and COPD patient, the addition of ipratropium bromide to salbutamol provide better response in treating acute asthma than the use of nebulised salbutamol alone13, 14. However, the study shows that patient with mid acute asthma gained little benefit from the combination therapy. Study by Rodrigo, 2005 indicates that early administration of inhaled anticholinergics with β2-agonists are effective in acute severe asthma in both children and adults15. However, there is no enough evidence to conclude that this combination could reduces the hospital admission. The beneficial effects of combination treatment in patients with mild acute asthma was not identified. There was no occurrence of severe side effects reported, although the presence of tremor in five studies in children is not significant. Practically, a nebulised beta agonist alone is sufficient for patient with moderate acute asthma as the initial treatment. But, if the condition is poorly controlled, adding an anticholinergic to the nebuliser would be a better to control the symptoms. There was complaint of tremor by a small group of patient but no other side effects were reported13. Unfortunately, the study fails to show that the combination therapy of albuterol with ipratropium bromide is beneficial for the treatment of acute asthma16. Overall, patient given with AVN immediately at the admission is a wise choice as there is significant evidence that it can improve patient’s FEV1.

Patient’s maintenance dose of MDI budesonide is 200 mcg twice daily and it is beneficial in management of asthma17. It is sufficient to control her exacerbation of asthma when inhale budesonide 400 mcg at a interval of 30 minutes18. Inhaled corticosteroid reduces rate of hospital admission by 10 patient need to be treated to prevent hospitalisation when compare to placebo. When the study compare the effect of inhaled corticosteroid with systemic corticosteroid, faster improvement reported after the admission of multiple doses of inhaled corticosteroid19. The use of low doses of inhaled corticosteroid is safe enough where no serious side effects were reported in the study. It is recommended that inhalation of fluticasone or budesonide through an MDI and spacer or nebulisation every 10 to 30 minutes is beneficial in acute asthma management. During hospitalisation, patient’s budesonide dose was increased to 200 mcg three times daily instead of 200 mcg twice daily. Studies show that there is no significant difference on dose-response relationship of inhaled corticosteroids17, 20, 21. There is no significant difference of the symptoms of asthma between the addition of higher dose inhaled corticosteroid to the standard low dose and when the inhaled corticosteroids were given alone21. The adverse effect of increasing inhaled corticosteroid outweigh its benefit. There is significant adverse effect of adrenal suppression and reduced in bone mineral density in adult with the use of budesonide more than 1600 mcg per day. Instead of increasing the dose of budesonide, the addition of long-acting beta agonist benefits more in mild persistent asthma22. There is significant reduction in risk of a first severe exacerbation and day of poorly controlled asthma in the addition of low dose formoterol to the inhaled budesonide compared to increasing the dose of budesonide. There are also significant improvement for rate of

severe exacerbations, FEV1, and morning PEF. The combination is well-tolerated by the patient report in most cases. To conclude, the doctor’s choice of increasing the dose of budesonide to 200 mcg three times daily is well accepted but patient’s asthma is poorly controlled. The addition of long-acting beta agonist might be beneficial than increasing the dose of budesonide. Symbicort tubohaler is a wise substitution for the current MDI budesonide.

Following the SIGN guideline, tablet prednisolone 30 mg was given immediately and once daily basis for at least 5 days or until the condition has improved. There is significant reduction in relapse and improvement in the quality of life when oral and inhaled corticosteroid are used in combination. There is also reduction in the use of β2-agonist inhaler and the symptoms of asthma observed23. Oral glucocorticoid is effective to be used for short term in acute asthma attack24. There is significant improvement in FEV1 in the patient with moderate and severe asthma after one week of taking oral glucocorticoid. Patient was also given with sustained release tablet theophylline 250 mg twice daily. The additional of theophylline to the current therapy improve the FEV1 and patient’s lung function. However, the use of theophylline need to be careful since it has narrow therapeutic range. Cough suppression, bromhexine hydrochloride, was given to the patient since she was having cough with sputum. There is limited evidence that the use of bromhexine could increase cough clearance25, 26. However, there is significant reduction in cough with p <0. 001(p <0. 05) and production of sputum with p <0. 01(p <0. 05) reported27.

The patient was also hypokalaemic, with potassium level 2. 9 mmol/L where the normal range is 3. 5-5. 1 mmol/L. Hypokalaemia can be a marker for overdose of inhaled salbutamol. The concomitant used of high doses of β2-agonist with theophylline and corticosteroid could increase the risk of hypokalaemia. Therefore, patient’s potassium level need to be corrected to normal range to prevent any further reduction by giving potassium supplement to the patient. She was given potassium chloride and her potassium level increase gradually near to the normal range.