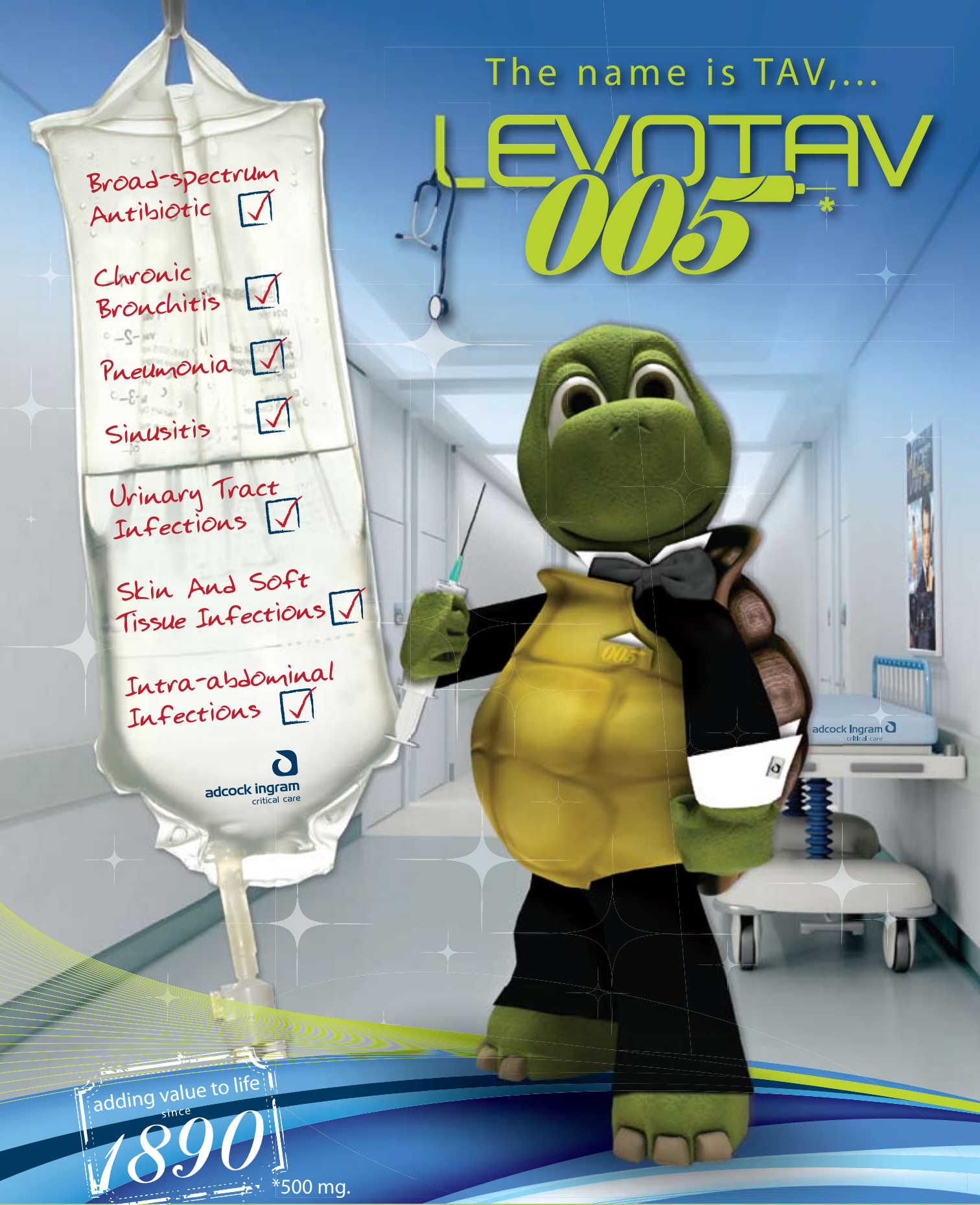


18 NOT FOR USE BY PERSONS UNDER THE AGE OF 18. PLEASE ENJOY RESPONSIBLY!

S4 **LevoTAV IV 500 Intravenous Infusion.** A: 20.1.1. Each 100 ml contains levofloxacin hemihydrate equivalent to 500 mg levofloxacin. Reg. No. 43/20.1.1/0784. *500 mg. **For full prescribing information refer to the package insert approved by the medicines regulatory authority. ZA.12.RES.027. Marketed by Adcock Ingram Critical Care (Pty) Ltd. Reg. No. 2000/004206/07.** Applicant: Adcock Ingram Limited. Reg. No. 1949/034385/06. Private Bag X69, Bryanston, 2021. Tel: +27 11 635 0000. BBBEE Status Level: Level 4 Contributor. **www.adcock.com**

adcock ingram critical care

Lifelong Learning

Opening Up the Airways in Severely Problematic Lungs

Problematic breathing and lung disease are on the increase, resulting in a loss of lifestyle quality and productivity for many. Chronic obstructive pulmonary disease (COPD) and asthma are just two of the 43 different respiratory diseases affecting people. Appropriate treatment can restore a high degree of daily functioning and quality of life.

Chronic obstructive pulmonary disease

COPD describes diseases of the lung that are associated with airway obstruction. COPD is a progressive condition which is partially reversible through treatment, especially when diagnosed early in its clinical course.

COPD covers:

- Chronic bronchitis – a chronic, inflammatory condition of the bronchi. It is characterised by coughing and expectoration of sputum, occurring on most days, lasting for three months or longer, for at least two consecutive years.
- Emphysema – a respiratory disorder characterised by enlargement and eventual destruction of the alveoli.

It is characterised by a chronic airflow limitation, airway inflammation, structural changes in the airways and lung tissue, and systemic effects such as pulmonary hypertension or cardiovascular disease. Treatment generally includes lifestyle changes and medication.

Although asthma is a condition associated with airway obstruction, and many people with COPD also suffer from asthma, asthma is not generally included under the COPD category.

Asthma

Asthma is a common chronic airway disorder characterised by variable and recurring symptoms, reversible airflow obstruction and bronchospasm. Symptoms may include wheezing, coughing, shortness of breath, and chest tightness. While there is no cure for asthma, symptoms can be improved. The most effective treatment is identifying the triggers and eliminating them. If trigger avoidance is insufficient, then medication is recommended.

Surveys in the US show that the prevalence of asthma has increased from 2001-2010 and is currently at its highest level. It is higher among children, adult females and those with family income below the poverty level. As of 2011, 235m - 300m people were affected globally, with approximately 250 000 deaths each year.

Treatment

Inhaled corticosteroids

Inhaled corticosteroids are the most effective long-term medication to reduce airway inflammation and mucous production. Their use leads to better asthma control with fewer symptoms and flare-ups and less need for hospitalisation. Inhaled steroids prevent symptoms, they do not relieve symptoms.

Mast cell stabilisers

These are only available in inhaled forms (cromolyn sodium). They have an anti-inflammatory action and prevent asthma symptoms. They need three to four weeks to begin working. They need to be taken two to four times a day to control asthma long-term. They have very few side-effects.

Leukotriene modifiers

These are chemicals that occur naturally in the human body and cause tightening of the airway muscles and mucous production. The modifiers (montelukast, zafirlukast and zileuton) work by blocking the action of leukotrienes in the body, to improve airflow and reduce asthma symptoms. The most common side-effects are headaches and nausea. Leukotriene modifiers may change the body's response to other drugs, such as warfarin.

Bronchodilator medication

Beta2-agonists (short- and long-acting forms)

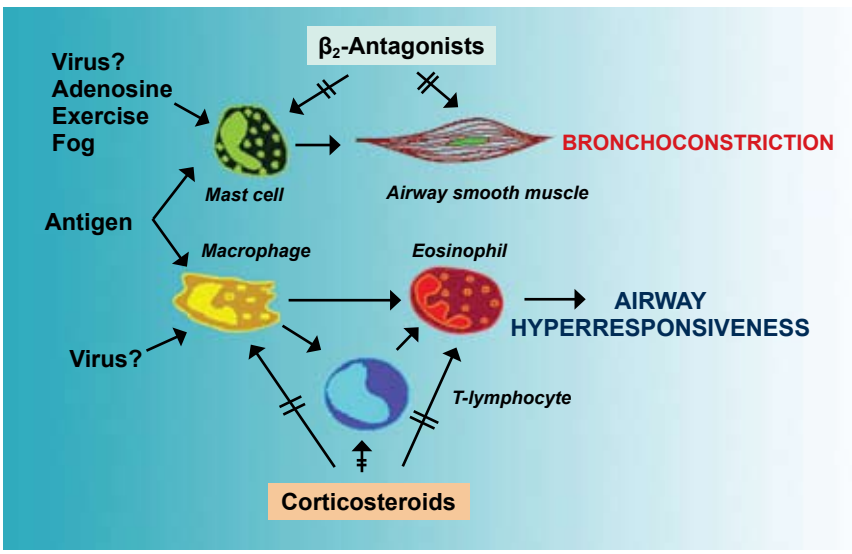
Short-acting beta2-agonists (SABA), such as salbutamol and fenetrol are the first line in asthma treatment as symptoms are quickly relieved. They work within 20 minutes and last four to six hours. They can prevent exercise-induced asthma if used 15-20 minutes before exercise. The inhaled forms are best for treating sudden and severe or new onset symptoms.

Long-acting beta2-agonists (LABA), such as salmeterol and formoterol are used for better control, not for relief. These drugs take longer to work and the benefits last longer, even up to 12 hours. Side-effects include nervous or shaky feelings, over-excitement or hyperactivity, increased heart-rate, and (rarely) upset stomach or trouble sleeping.

Anticholinergics (short- and long-acting)

Anticholinergic medications, such as ipratropium bromide and tiotropium bromide, provide additional benefits when used in combination with SABAs in those with moderate or severe symptoms. Ipratropium is used four times a day whereas tiotropium is only used once a

Figure: Beta2-agonist/corticosteroid treatment action



Mast cells are a resident cell 6 of several types of tissues, and contain many granules rich in histamine and heparin. Although best known for their role in allergy and anaphylaxis, they have a protective role in wound healing and defence against pathogens. Eosinophils are a type of white blood cell produced in the bone marrow and are normally found in the bloodstream and gut lining. Eosinophils along with basophils and mast cells are important mediators of allergic responses and asthma pathogenesis and are associated with disease severity. Beta2-agonist/corticosteroid treatment reduces mast cell and eosinophil activity.

day, as its action lasts for 24 hours. These are not quick relief medications but they can enhance the bronchodilator effect for certain asthmatics with difficult-to-control symptoms. Anticholinergic bronchodilators can be used when SABAs cannot be tolerated. The most common side-effect is a dry throat, and blurred vision if it gets into the eyes. However, it should be used with care in patients with prostatic hyperplasia.

Anticholinergic bronchodilators (or muscarinic antagonists) block the parasympathetic nerve reflexes that cause the airways to constrict, thereby allowing airways to remain open. Muscarinic receptor antagonists bind to muscarinic receptors and inhibit acetylcholine mediated bronchospasm. They are used more often to treat COPD than asthma.

Ipratropium bromide is a muscarinic antagonist that is structurally related to atropine, but considered safer and more effective for inhalation use. It is used as a bronchodilator in the management of cholinergic-mediated bronchospasms associated with COPD and in the treatment of rhinnorrhea associated with the common cold or with allergic or non-allergic seasonal rhinitis.

Theophylline

Theophylline (dimethyxanthine) has been used for over 80 years in the treatment of airway disease. Originally it was used as a bronchodilator but the required relatively high doses were associated with frequent side-effects, resulting in a decline in use as inhaled beta2-agonists became more widely used. More recently it has been found to have anti-inflammatory effects in asthma and COPD at lower concentrations.

Theophylline is usually used as an add-on therapy in asthma patients not well controlled on corticosteroids with or without LABA and in COPD patients with severe disease not controlled by bronchodilator therapy.

Low dose theophylline may be useful in reversing corticosteroid-resistance in COPD and asthma.

Combination medications

There is evidence that corticosteroid/beta2-agonist combination therapy has complimentary, additive, and synergistic inhibiting effects on pro-inflammatory signalling pathways, inflammatory mediator release, and recruitment and survival of inflammatory cells. In the asthmatic patient, the enhanced anti-inflammatory activity is greater than using either drug alone. The combined activity (see figure) may also overcome the reduced sensitivity to inhaled corticosteroids that have been reported in some patients with COPD.

In patients with COPD, treatment with an inhaled corticosteroid (ICS) is associated with an increased risk of pneumonia which should be carefully considered when assessing the risk/benefit ratio of ICS/LABA combinations.

Subphenotyping patients with COPD (such as frequent exacerbations, sputum eosinophilia, and mixed asthma/COPD phenotype) might help to identify patients who are most likely to benefit from the addition of ICS to bronchodilating treatments.

Inhalation delivery devices

The metered dose inhaler (MDI) with spacer is more commonly prescribed than nebulisation for bronchodilator therapy when treating mild to moderate asthma. Nebulisers, though, require very little effort to use, especially if a patient's co-ordination is not sufficiently appropriate to use an MDI. MDIs require a level of skill to correctly deliver medicine to the lungs. When used incorrectly, MDIs may deposit most of the medication into the back of the mouth rather than into the lungs. This can cause hoarseness and thrush.

Unlike inhalers which generally require the patient to breathe in when releasing the medication, medication in a nebuliser flows continuously, allowing the patient to breathe normally during the treatment. The main advantage of nebulised drugs is that they are deposited directly into the respiratory tract allowing higher drug concentrations to be achieved in the bronchial tree and pulmonary bed with fewer adverse effects than when the systemic route is used. Newer nebulisers are small enough to be portable, although not as portable as inhalers which can fit into a pocket. There are three types of nebulisation systems: ultrasonic, jet and mesh nebulisers. Of the three, mesh nebulisers are the most effective. They are also the most compact, quietest and most rapid, which improves patient compliance.

RELEASE THE STRANGLE HOLD OF ASTHMATIC ATTACKS WITH THE 4-WAY SOLUTION!

4 the relief of reversible airways obstruction from Adcock Ingram Critical Care

Adco-Fenoterol

FENOTEROL HYDROBROMIDE

When they need to
Breathe easy in asthma

Fenoterol acts to relax bronchial smooth muscle

- Indicated for:
  - Prophylaxis of exercise-induced asthma
  - Symptomatic treatment of acute asthmatic episodes of bronchospasm in COPD
- Can be administered using a range of commercially available nebulising devices

Adco-Nebrafen

NEBRAFEN
When they need to
Breathe even easier in asthma

- Duration of action is about 6 hours
- Combination of fenoterol hydrobromide 1,25 mg (selective β2-agonist) + ipratropium bromide 0,5 mg (anticholinergic)
- Treatment of reversible airways obstruction e.g. bronchial asthma and emphysema
- Isotonic and preservative free and is ready for use. No dilution needed

Adco-Ipratropium

IPRATROPIUM BROMIDE

When they need **Room to breathe in COPD**

- Maintenance treatment of bronchospasm associated with chronic obstructive pulmonary disease
- Anticholinergic properties - well tolerated and does not affect mucocilliary clearance
- Onset of effect from 5 – 15 minutes, however, long lasting effect for up to 6 – 8 hours in some patients
- Adco-Ipratropium can be used concomitantly with other medications such as sympathomimetic bronchodilators

Adco-Combineb

COMBINEB
When they need
More room to breathe in COPD

- Indicated for reversible bronchospasm associated with obstructive pulmonary disease
- Combining the benefits of ipratropium with salbutamol, a β2 selective agonist relaxing bronchial smooth muscle
- Salbutamol acts rapidly (within minutes). Action persists for 3-4 hours
- Activates pulmonary β2-receptors to relax bronchial smooth muscle and decrease airway resistance

S3 ADCO-FENOTEROL 0,5 mg/2 ml. Reg. No. 33/10.2.1/0194. Each 2 ml solution contains 0,5 mg fenoterol hydrobromide. S3 ADCO-FENOTEROL 1,25 mg/2 ml. Reg. No. 33/ 10.2.1/ 0195. Each 2 ml solution contains 1,25 mg fenoterol hydrobromide. S3 ADCO-NEBRAFEN. Reg. No. 35/10.2.1/0004. Each 4 ml ampoule contains fenoterol hydrobromide 1,25 mg and ipratropium bromide 0,5 mg. S2 ADCO-IPRATROPIUM 0,25 mg/2 ml. Reg. No. 33/10.2.1/0270. Each 2 ml solution contains 0,25 mg ipratropium bromide. S2 ADCO-IPRATROPIUM 0,5 mg/2 ml. Reg. No. 33/10.2.1/0271. Each 2 ml solution contains 0,5 mg ipratropium bromide. S3 ADCO-COMBINEB. Reg. No. A39/10.2.1/0373. Each 2,5 ml contains ipratropium bromide equivalent to 0,50 mg ipratropium bromide anhydrous and salbutamol sulphate equivalent to 2,50 mg salbutamol base.

Applicant: Adcock Ingram Limited. For full prescribing information please refer to the package insert approved by the regulatory authorities. ZA.11.RES.016 05/2011

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