Treating Mental Disorders

Biological Treatments for Psychological Disorders

Aims: Describe and Assess Biological Treatments

Objectives

By the end of this session you should be able to:

• Describe the use of three biological treatments for mental disorders
• Describe the mode of action of three biological treatments
• Assess the appropriateness and effectiveness of three biological treatments
• Comment of the ethical implications of biological treatments

Assessment:

Essay Question:

(a) Describe two biological treatments for mental disorders.

(b) Assess these treatments in terms of their appropriateness and effectiveness.

Types of Biological Treatment

Basic principle: correct cognitive, emotional and behavioural problems by causing changes in biological functioning.

• Drugs (e.g. antidepressants, antipsychotics)
• Surgery (e.g. lobotomy, cingulotomy)
• Electro-convulsive Therapy

Drug Treatments for Psychological Disorders

• Different parts of the brain communicate by using chemicals called neurotransmitters.
• Drugs alter brain functioning by adjusting the levels of neurotransmitters
• Agonists increase neurotransmitter levels
• Antagonists decrease neurotransmitter levels.

Neurotransmitters

• Dopamine (DA)
• Serotonin (5-HT)
• Noradrenaline (NA)
Drugs and Synaptic Activity

- Brain cells (neurones) communicate with each other at junctions called synapses.
- Drugs alter neurotransmitter levels by affecting how synapses work.

*Fig 1: A Synapse*

- A nerve impulse reaches the presynaptic terminal
- Vesicles containing neurotransmitter are released.
- The neurotransmitter drifts across the synaptic gap
- Neurotransmitter molecules bind to receptor sites on the postsynaptic neurone.
- This causes the postsynaptic neurone to produce a nerve impulse.

Drugs interfere with this process by either:

- Acting as if they are neurotransmitters (agonist)
- Causing the neurotransmitters to last longer in the synaptic gap (agonist)
- Blocking the receptor sites so the neurotransmitter can not activate them. (antagonist)

Common Psychiatric Drugs

<table>
<thead>
<tr>
<th>Type of Drug</th>
<th>Used to Treat</th>
<th>Major Varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antidepressant</td>
<td>Depression</td>
<td>MAOIs, Tricyclics, SSRIs</td>
</tr>
<tr>
<td>Anxiolytics</td>
<td>Anxiety</td>
<td>Barbiturates, Benzodiazepines</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>Schizophrenia</td>
<td>Phenothiazines, Butyrophenones, Benzamides</td>
</tr>
</tbody>
</table>

(Activity 1 – Actions of Different Antidepressants)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Action &amp; Neurotransmitter Affected</th>
<th>Mode of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAOIs</td>
<td>DA, NA &amp; 5-HT agonist</td>
<td>Stops neurotransmitters from being deactivated</td>
</tr>
<tr>
<td>Tricyclics</td>
<td>DA, NA &amp; 5-HT agonist</td>
<td>Stops neurotransmitters from being taken back up</td>
</tr>
<tr>
<td>SSRIs</td>
<td>5-HT agonist</td>
<td>Stops neurotransmitters from being taken back up</td>
</tr>
</tbody>
</table>
Effectiveness of Drug Therapies: Overview

- Drug treatment is usually superior to no treatment.
- Between 50 – 65% of patients benefit from drug treatments.
- ‘Clinically significant improvement’ does not mean ‘cure’.
- Some patients may still have some symptoms.
- Between 35 – 50% of patients do not improve.
- Symptoms may return (or worsen) if drugs are stopped.

Appropriateness of Drug Therapies

- Drug therapies bring short-term improvements in most psychological symptoms.
- Patients often welcome drug therapy, as it is quicker, easier and less threatening than talk therapy.
- Drugs make it possible for the patient to benefit from other therapies.
- Some drugs cause dependency.
- All drugs have the potential to produce side effects.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Action &amp; Neurotransmitter Affected</th>
<th>Mode of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenothiazines</td>
<td>DA antagonist</td>
<td>Blocks DA receptors</td>
</tr>
<tr>
<td>Benzamides</td>
<td>DA &amp; 5-HT antagonist; Glutamate agonist</td>
<td>Blocks DA and 5-HT receptors; Prevents glutamate reuptake</td>
</tr>
</tbody>
</table>

Effectiveness of Drug Therapies

The effectiveness of a drug is assessed in terms of the percentage of a sample of patients taking the drug that experience a ‘clinically significant improvement’.

<table>
<thead>
<tr>
<th>Source</th>
<th>Drugs tested</th>
<th>% CSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGP (1993)</td>
<td>MAOIs, Tricyclics, SSRIs</td>
<td>50-54% (dropouts included as ‘no CSI’)</td>
</tr>
<tr>
<td>Barlow &amp; Durand (1995)</td>
<td>Tricyclics</td>
<td>65% (dropouts excluded)</td>
</tr>
<tr>
<td>Davidson &amp; Neale (1992)</td>
<td>Phenothiazines</td>
<td>60%</td>
</tr>
<tr>
<td>Kalat (1998)</td>
<td>Benzamides</td>
<td>65%</td>
</tr>
</tbody>
</table>

Main side effects

<table>
<thead>
<tr>
<th>Drug</th>
<th>Main side effects</th>
</tr>
</thead>
</table>
| MAOIs    | Hypertension
Toxic when taken with other drugs
Toxic when taken with some foods |
| Tricyclics | Weight gain (average 7kg)
Cardiac problems
Potential for overdose
Sudden death in children (rare) |
| SSRIs    | Upset stomach
Insomnia
Severe anxiety (rare) |
Side effects of different drugs cont.

<table>
<thead>
<tr>
<th>Phenothiazines</th>
<th>Weight gain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inability to concentrate</td>
</tr>
<tr>
<td></td>
<td>Parkinsons symptoms</td>
</tr>
<tr>
<td></td>
<td>Akinesia (immobile face)</td>
</tr>
<tr>
<td></td>
<td>Tardive dyskinesia (twitching)</td>
</tr>
<tr>
<td>Benzamides</td>
<td>Loss of white blood cells (rare, but potentially fatal)</td>
</tr>
</tbody>
</table>

Side Effects are a Problem Because:

- They are distressing for the patient.
- They may be worse than the symptoms the drug was supposed to treat.
- They may affect the patient’s willingness to continue treatment.

Ethics: some questions to consider:

- Is it significant that most of the clinical trials of the effectiveness of drug therapies are conducted and paid for by the companies that produce the drugs?
- Is it right to force a schizophrenic patient to take antipsychotics, even if they suffer from side effects?
- Do you think it matters that, in a survey of psychiatrists by Haddock and Slade (1996), more than half said they would refuse phenothiazines if they were prescribed to them?

Surgical Treatments for Psychological Disorders

- Different parts of the brain control different psychological processes.
- Abnormalities in the brain can cause psychological symptoms.
- Disconnection or destruction of brain tissue can relieve some symptoms.

Methods Used to Surgically Alter the Brain

- Cutting
- Burning with an electrode or laser
- Injecting neurotoxins
- Destruction using gamma radiation (non-invasive)

General Procedure

- Surgery taken place while the patient is conscious.
- The scalp is removed and the skull opened up.
- The surgeon uses a stereotaxic instrument to navigate around the brain.
- Scanning technology is used to track the operation’s progress.
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Used to Treat</th>
<th>Involves</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontal Lobotomy</td>
<td>Schizophrenia</td>
<td>Severing the entire frontal lobe of the brain</td>
<td>No longer used</td>
</tr>
<tr>
<td>Leukotomy</td>
<td>Schizophrenia, Anorexia</td>
<td>Less radical lobotomy</td>
<td>Rarely used, banned in some countries</td>
</tr>
<tr>
<td>Cingulotomy</td>
<td>Anxiety (OCD)</td>
<td>Severing connections between frontal lobes and limbic system</td>
<td>Less radical, but used only as a last resort</td>
</tr>
<tr>
<td>Callosotomy</td>
<td>Epilepsy</td>
<td>Severing connection between cerebral hemispheres</td>
<td>Used in life-threatening cases</td>
</tr>
</tbody>
</table>

**Effectiveness of Surgery**

- Lobotomy: not clinically effective, but makes patient more docile and manageable.
- Leukotomy: some success, but similar problems to lobotomy.
- Cingulotomy: Case studies suggest CSI in about 60% of cases.

**Appropriateness of Surgery**

Surgery is used only as a last resort, where the patient has failed to respond to other forms of treatment and their disorder is very severe.

This is because:

- All surgery is risky.
- The effects of neurosurgery can be unpredictable.
- There may be no benefit to the patient.
- The effects are irreversible.
- Surgery has been abused in the past, especially lobotomy and leucotomy.

**Summary**

- Biological treatments alter the functioning of the brain.
- They include drugs, surgery and ECT.
- Drugs are effective in 50-65% of cases, but can cause side effects.
- Surgery can work, but is used as a last resort.