

# *Secondary Brain Tumor*

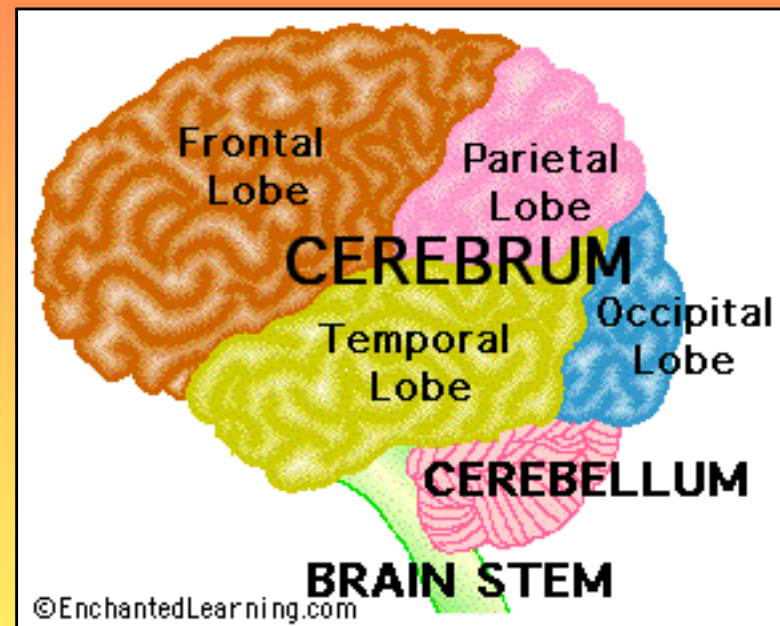


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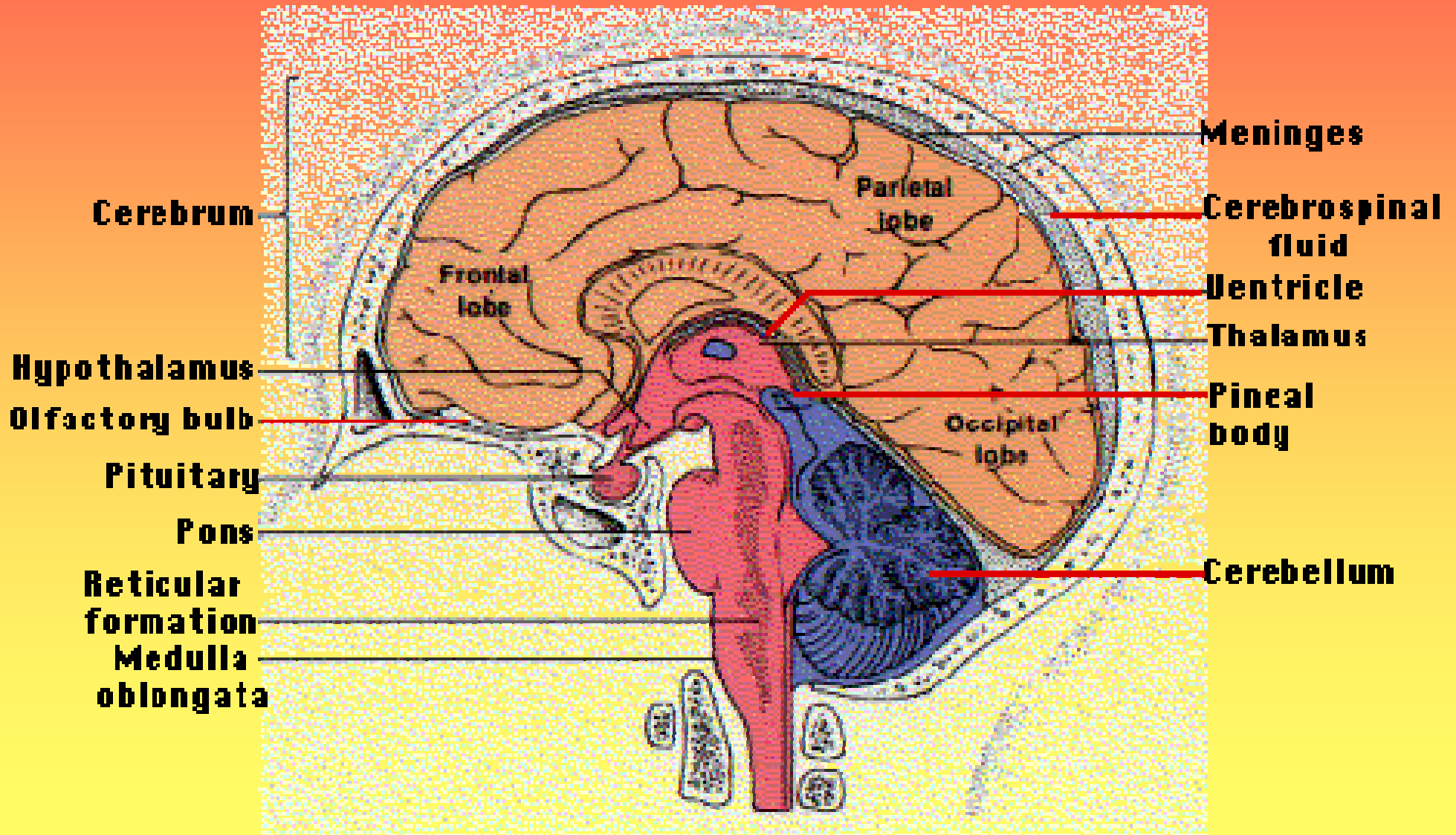
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# Pendahuluan

- Lokasi yang berbeda dari otak mempunyai fungsi yang berbeda
- Tumor dari otak mempunyai prognosis, gejala, dan penatalaksanaan yang berbeda.



# Parts of the Brain



# ...Brain Tumors

- Tumor primer dapat berasal dari berbagai jaringan otak
- Tumor otak paling sering berupa tumor otak sekunder
- Beberapa tumor bisa mengandung beberapa jenis sel
- Tumor primer otak sangat jarang menyebar ke bagian tubuh lain

# Brain Metastasis

- Merupakan tumor yang berkembang dari sel-sel kanker → menyebar dari kanker pada bagian tubuh lain ke otak, biasanya melalui aliran darah.
- Sebaliknya, tumor yang berasal dari otak atau jaringan sekitarnya → tumor primer, dan berdasarkan definisi di atas bukan suatu metastasis otak.

# Insiden

- Metastasis otak terjadi 20% - 40% pasien kanker.
- Lebih dari 75% pasien mempunyai lesi multipel.
- Penyebab tersering sumber metastasis pd dewasa (Sawaya et al, 2001):
  - Paru-paru 32% akan metastasis ke otak,
  - Payudara 21%,
  - Kulit (melanoma) 48%,
  - Gastrointestinal 6%,
  - Renal 11%
- Secara umum hampir semua kanker sistemik dapat menyebar ke otak.
- Penting untuk menentukan sumber primernya → pilihan penatalaksanaan yang efektif.

**Table 2** Systemic cancer diagnosis in 88 patients whose malignancy presented as brain metastasis

| Primary site              | Cases, n (%) |
|---------------------------|--------------|
| Lung                      | 72 (82)      |
| Nonsmall-cell lung cancer | 63           |
| Small-cell lung cancer    | 9            |
| Unknown primary           | 9 (10)       |
| Melanoma                  | 3 (3)        |
| Breast                    | 1 (1)        |
| Gastrointestinal          | 1 (1)        |
| Renal                     | 1 (1)        |
| Uterine cervix            | 1 (1)        |

# Gejala

- Dua pertiganya disebabkan karena:
  - $Pe \uparrow$  TIK  $\rightarrow$  karena pertumbuhan tumor, edema jaringan disekitar tumor, hidrocefalus, dengan gejala tidak spesifik spt nyeri kepala, mual, muntah, perubahan status mental, letargi.
  - Iritasi fokal, atau destruksi jaringan otak  $\rightarrow$  gejala bervariasi seperti kejang, paralisis, gangguan penglihatan, perubahan gait tergantung lokasi lesi metastasis.



**Table 1** Clinical features of patients with a newly detected brain mass in the absence of known cancer

|                                    | Patients with<br>a brain<br>metastasis | Patients with<br>a primary<br>brain tumor | <i>p</i> Value |
|------------------------------------|--|---|----------------|
| No. of patients                    | 88                                     | 88  |                |
| Average age, y                     | 60.3                                   | 59.2                                      | 0.59           |
| Male:female                        | 1:1                                    | 1.8:1                                     | 0.07           |
| Emergency ward<br>presentation, %  | 60                                     | 32  | <0.01          |
| Average duration of<br>symptoms, d | 48                                     | 54  | 0.56           |
| Percentage with lung<br>cancer     | 82                                     | 0   |                |
| Presenting neurologic<br>symptoms* |  |   |                |
| Headache                           | 32                                     | 30  | 0.87           |
| Altered mental status              | 29                                     | 38  | 0.21           |
| Weakness                           | 26                                     | 25  | 1              |
| Seizure                            | 12                                     | 19  | 0.23           |
| Mean ESR, mm/h                     | 49                                     | 23  | <0.01          |

\* Total exceeds 88 because patients had more than one presenting symptom.

ESR = erythrocyte sedimentation rate.

Table 2

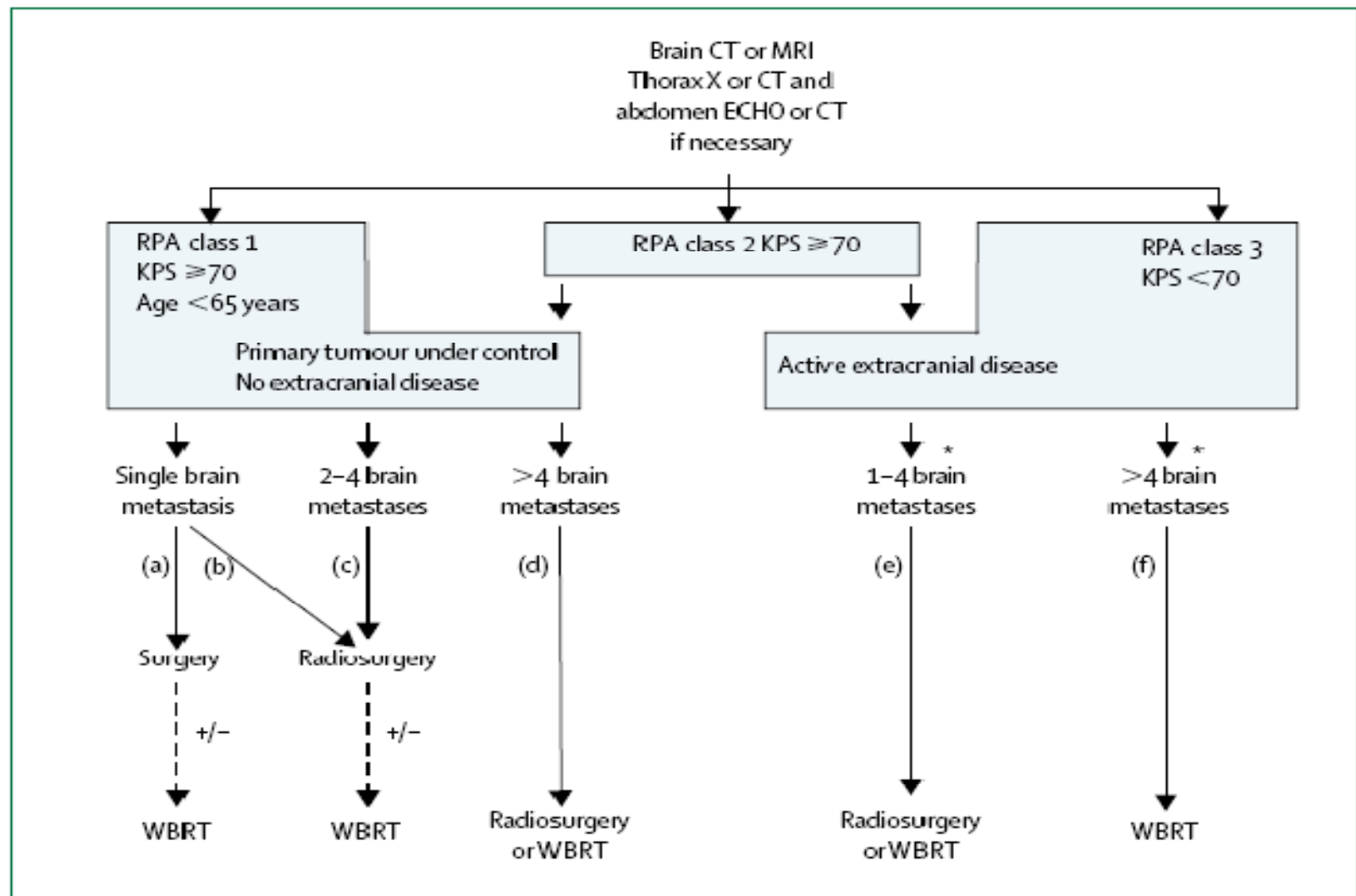
Presenting clinical features in 1013 patients with brain metastases

| Symptoms and signs                                      | Percentage with feature |
|---|-------------------------|
| Cognitive or mental status change                       | 34                      |
| Headache  | 31                      |
| Weakness  | 24                      |
| Seizure   | 19                      |
| Ataxia  | 11                      |
| Visual change   | 5                       |
| Nausea or vomiting                                      | 4                       |
| Other (includes bulbar symptoms, dizziness and syncope) | 4                       |
| Sensory change  | 2                       |
| Papilledema   | 0.5                     |
| None  | 9                       |

*Data from references [10,12,27].*

# Jenis sel dan Jaringan

- Tumor sangat tergantung oleh jenis sel (*benign/malignant*)
- Sangat bervariasi → prognosis & treatment



**Figure: Therapeutic strategy in brain metastases**

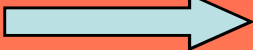
(a) Surgery plus WBRT (hyperfractionated) or surgery plus MRI follow-up should be considered in patients with a single metastasis. (b) In eloquent areas, radiosurgery (with or without WBRT) is the treatment of choice. (c) For patients with two to four small metastases, radiosurgery (with or without WBRT) can be applied. (d) Patients with more than four metastases may benefit from radiosurgery or WBRT (hypofractionated, daily doses 3–6 Gy). (e) Patients with active extracranial disease, a low KPS, and a small number of metastases may benefit from radiosurgery or hypofractionated WBRT. (f) Patients with multiple metastases may benefit from WBRT (hypofractionated). \* Symptomatic care only, including corticosteroids, may be the main treatment in severely affected patients.



**New Case of Brain Tumor**



Clinical-Neurologic Examination



**Neuro Emergency**



Medical anticipation



Diagnostic Procedure :  
- Ro, CT Scan, MRI, MRA, MRS, PET- SPECT  
- Laboratory  
- EEG, Doppler, Evoked Potential

Non Brain Tumor



Primary Brain Tumor  
- Staging/Grading  
- IICP  
- PA  
- Total Removal  
- To Reduce Tumor Size

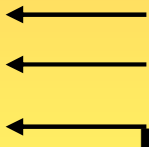


Positive Brain Tumor:  
• VP Shunt  
• Biopsy  
- Stereo tactic  
- Open



Secondary Brain Tumor  
- IICP  
- Soliter

3 cm  
Definitive Radio Tx  
3 Modalities Treatment



- Resection



Radiotherapy



**Histologic finding (PA)**

Chemotherapy  
Radiotherapy



Depend on Primary Cancer



Out come

**Quality of life & life expectancy**

Table 1

Criteria and median survival time for recursive partitioning analysis (RPA) classes I–III in 1176 patients with brain metastases (according to Gaspar and colleagues [3])

| RPA class | Criteria   | Median survival time (months) |
|-----------|--|-------------------------------|
| I         | All of the following criteria present:<br>Karnofski performance status $\geq 70$ < 65 years of age controlled primary tumour no extracranial metastases                    | 7.1                           |
| II        | Karnofski performance status $\geq 70$ and at least one of the following: < 65 years of age uncontrolled or synchronous primary tumour presence of extracranial metastases | 4.2                           |
| III       | Karnofski performance status < 70  | 2.3                           |

## Karnofsky Performance Score

- 100% The patient has no complaints and is without evidence of disease
- 90 The patient has minor *signs/symptoms*, but is able to carry out his or her normal activities
- 80 The patient demonstrates some *signs/symptoms* and requires some effort to carry out normal activities
- 70 The patient is able to care for self, but is unable to do his or her normal activities or active work
- 60 The patient is able to care for self, but requires occasional assistance
- 50 The patient requires medical care and much assistance with self care
- 40 The patient is disabled and requires special care and assistance
- 30 The patient is severely disabled and hospitalisation is indicated; Death is not imminent
- 20 The patient is very ill with hospitalisation and active life-support treatment necessary
- 10 The patient is moribund with fatal process proceeding rapidly
- 0 Dead



## **Box 1. Major differential diagnoses of brain metastases**

Primary brain tumor

- Glioma

- Primary CNS lymphoma

- Others

Infection

- Abscess

- Herpes encephalitis

Granuloma

Demyelinating plaque

Infarction

Radiation necrosis in a previously treated metastasis

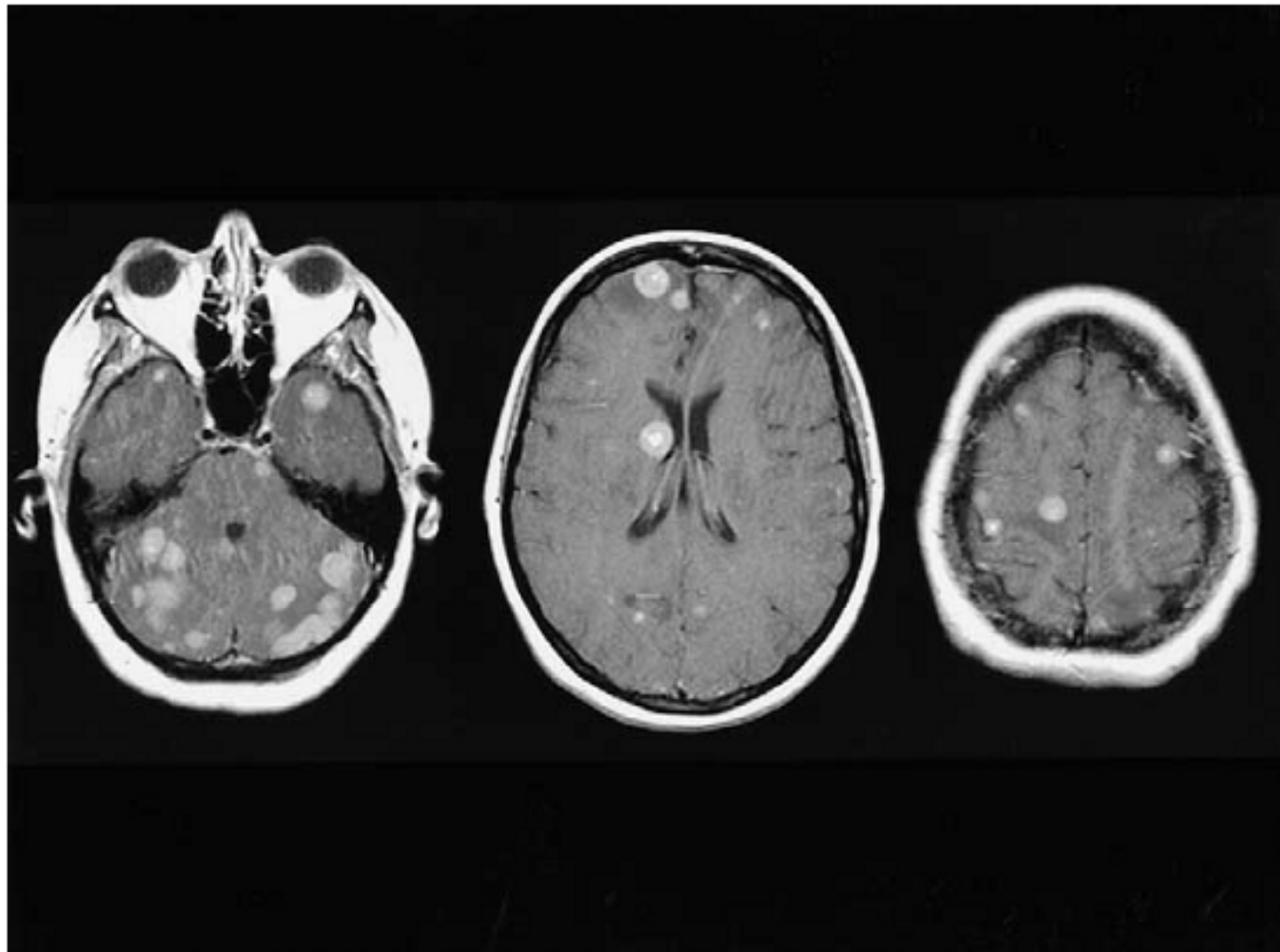


Fig. 1. Contrast-enhanced brain Magnetic Resonance Imaging (MRI) from a woman with breast cancer. Despite the presence of innumerable metastases, she presented without significant focal symptoms, as if the bilateral lesions "balanced" each other.

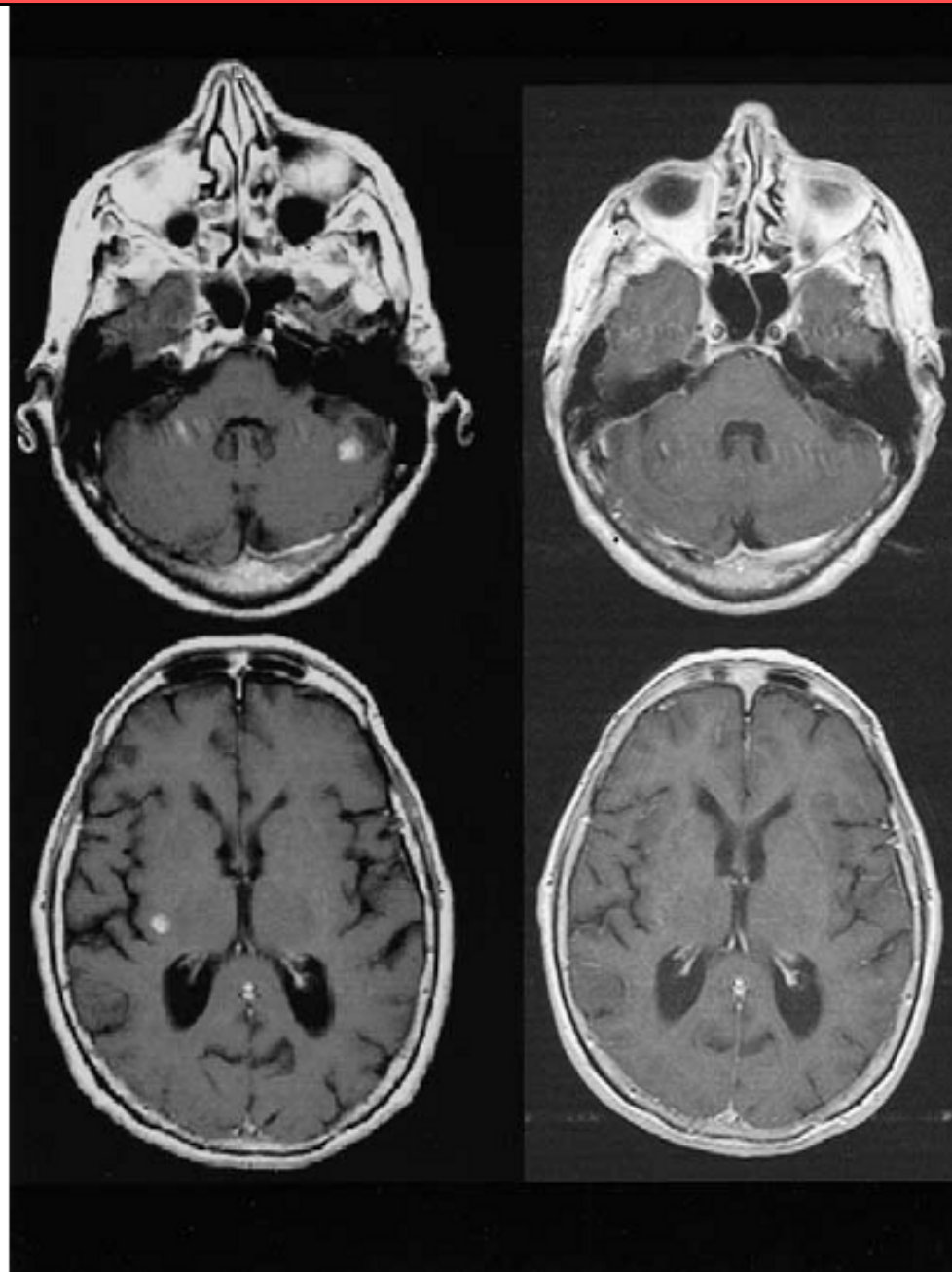
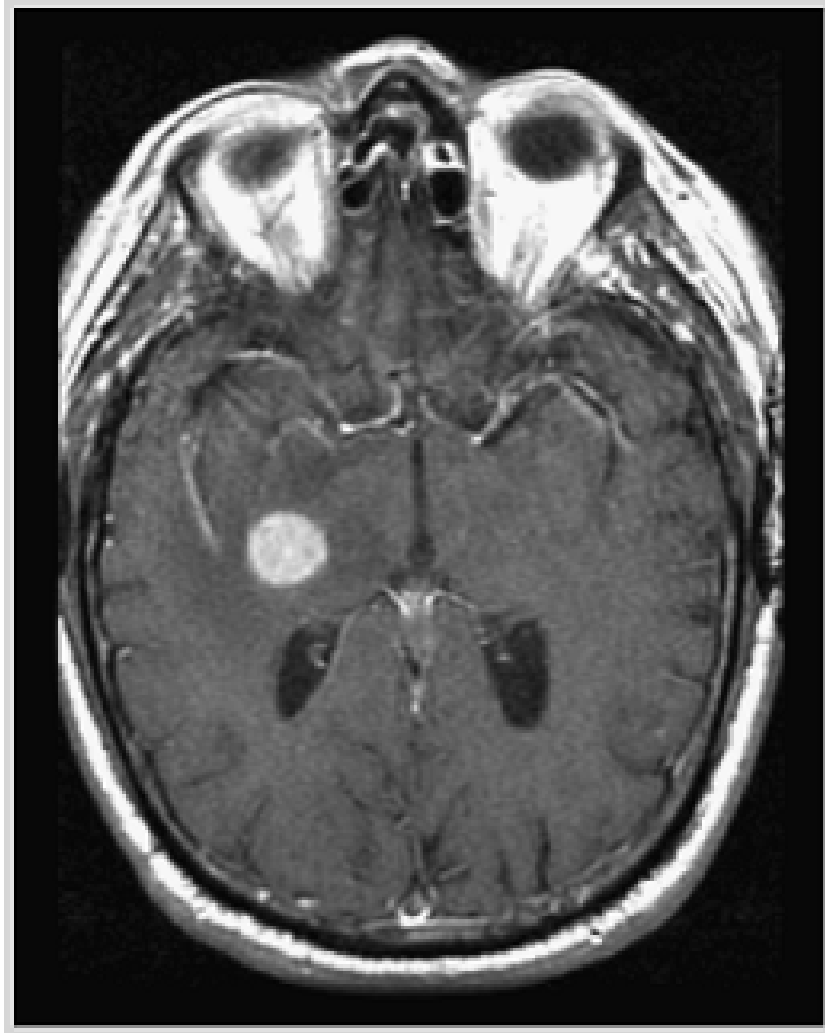


Fig. 2. Contrast-enhanced brain Magnetic Resonance Imaging (MRI) before (*left*) and after (*right*) two cycles of Temodar for brain metastases from Non-Small-Cell Lung Cancer (NSCLC). The lesions have disappeared.



**FIGURE 1-5**

Solitary brain metastasis in eloquent brain.

- Gambar metastasis otak *single lesion* dari penderita *non-small cell carcinoma* paru dari hasil biopsi

# Faktor –faktor Prognostik sebagai Pertimbangan Penatalaksanaan

- 1. Usia
- 2. *General Health*
- 3. Ukuran Tumor
- 4. Lokasi Tumor
- 5. Jenis Tumor

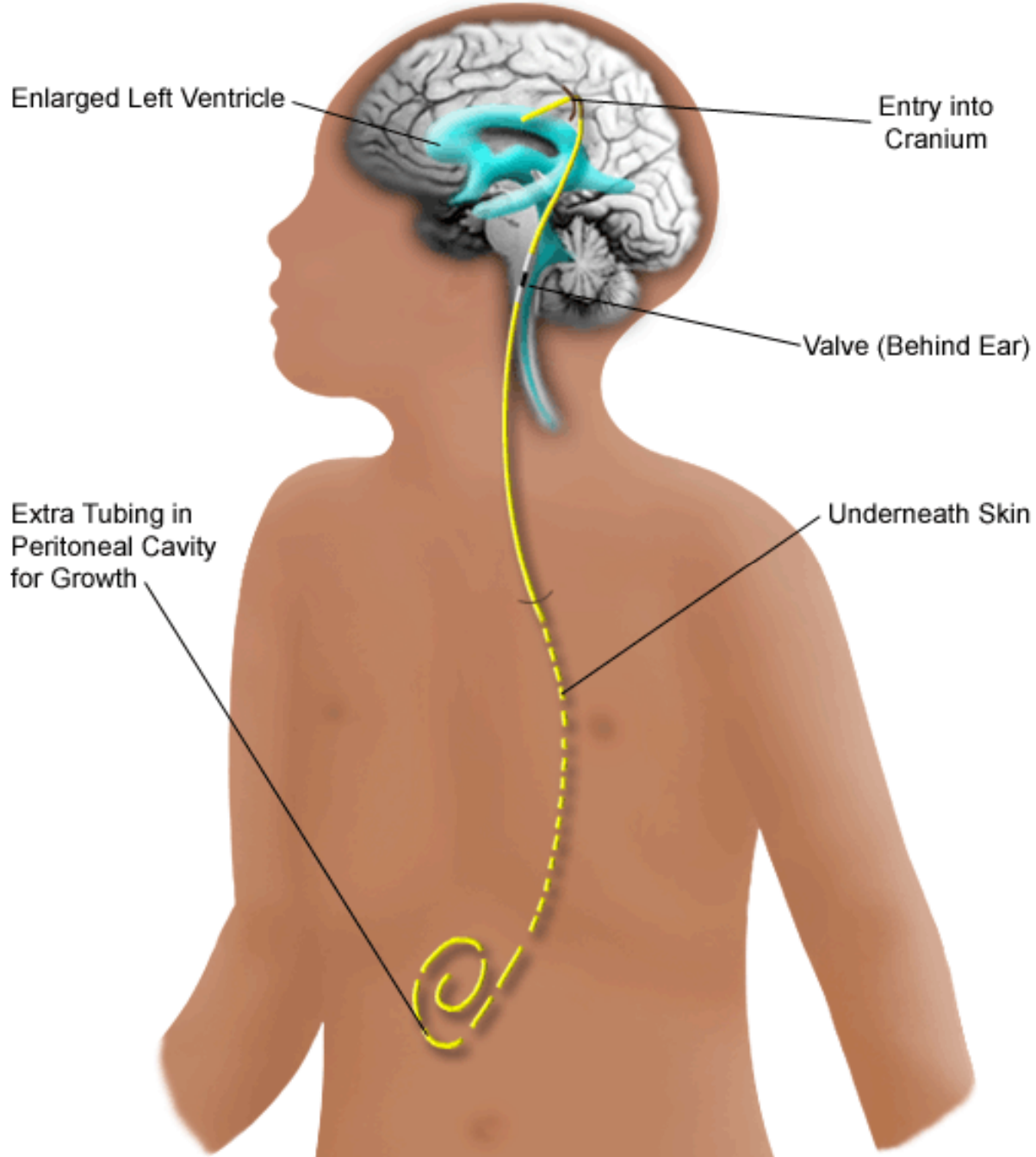
# Penatalaksanaan

- Tiga Metode Utama
  - *Surgery*
  - *Radiotherapy*
  - *Chemotherapy*
- Penatalaksanaan dapat menginduksi perubahan struktur dan fungsional otak yang meninggalkan efek samping yang lama (masalah bicara dan bahasa)

# Terapi *Pre-Surgery*

- Steroid → menghilangkan *swelling*, contoh dexamethasone
- Anticonvulsant → untuk mencegah dan mengontrol kejang, seperti carbamazepine
- Shunt → digunakan untuk mengalirkan cairan cerebrospinal

# Ventriculoperitoneal Shunt Placement





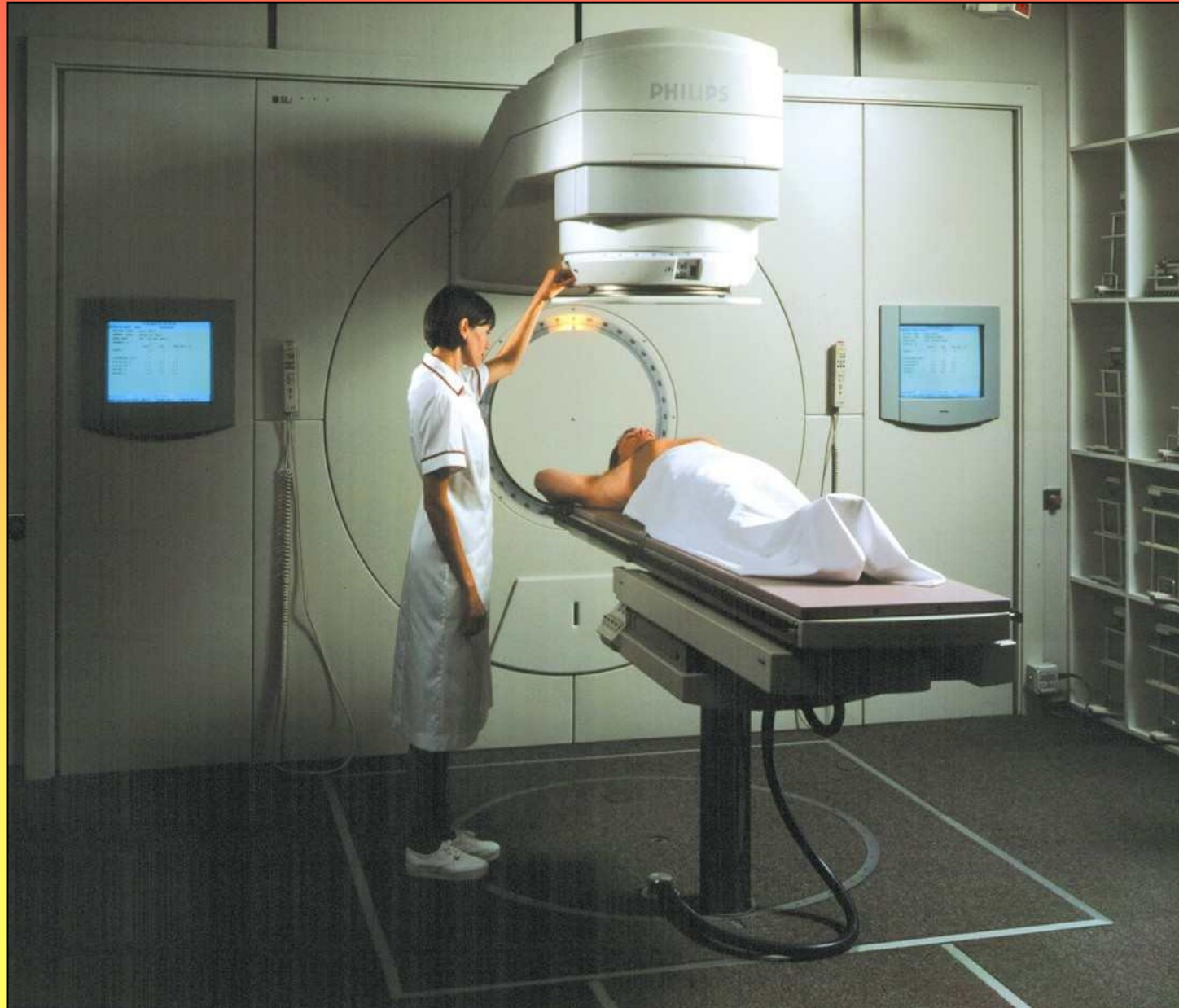
# *Surgery*



# *Surgery*

- Merupakan pilihan utama penatalaksanaan untuk mengangkat tumor
- Perkembangan *surgery*, seperti “gamma knife”, mempunyai komplikasi yang rendah dan mengurangi waktu pemulihan
- Pengangkatan tumor → jarang menghilangkan gejala

# *Radiotherapy*



# *Radiotherapy*

- Menggunakan sinar peng-ion untuk mematikan sel tumor
- Terapi lokal - regional
- Tujuan terapi Rt
  - Membunuh sel tumor sebanyak mungkin dengan menghindari sebanyak mungkin jaringan sehat dari efek radiasi
  - Menghilangkan symptoms pada penderita dengan tujuan memperbaiki kualitas hidup

# *Radiasi Eksterna*

- *Memberikan radiasi peng-ion dengan sumber radiasi terletak pada jarak tertentu dari obyek.*
- *Dengan kemajuan teknologi dapat dihindarkan jaringan otak sehat memperoleh dosis radiasi yang berlebihan. Sinar dapat ditunjukan dengan akurasi yang tinggi pada tumor.*
- Terapi diberikan 5 hari/minggu selama 4-6 minggu

# *Brachytherapy*

- Memberikan sumber radiasi langsung pada tumor sehingga diperoleh dosis yang tinggi sekali pada tumor tapi tidak pada jaringan sehat sekitarnya.
- Metode pemberian dengan sistem implan.

# *Chemotherapy*



# *Chemotherapy*

- Menggunakan *powerful drugs*, bisa 1 atau kombinasi untuk membunuh sel tumor
- Diberikan oral, IV, atau *shunt*
- Biasanya diberikan dalam siklus
- Satu siklus terdiri dari treatment intensif dalam waktu singkat, diikuti waktu istirahat dan pemulihan
- Siklus sedikitnya 2 minggu
- Saat siklus 2-4 telah lengkap, istirahat untuk terapi → melihat apakah tumor mempunyai respon terhadap terapi



## Box 2. Treatment for brain metatases

### Symptomatic

Corticosteroids    Pain Killer

Anticonvulsants

### Definitive

Whole-brain radiotherapy

Surgery

Stereotactic radiosurgery

Chemotherapy

### Supportive

# Tenina Kasih

