Cancer Pain Management
Pharmacological Treatment and Beyond

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One of the most common symptom experienced by cancer patients
About 80% of the 6-7 million patients dying of cancer annually in the US, suffer from pain
Prevalence rises with advancing disease
Approximately 25% of newly diagnosed patients, 33% of patients undergoing treatment, and 75% of advanced-cancer patients experience pain\(^1\)
Most common cause of cancer pain: bone metastases

1-Weiss SC et al. Lancet 2001
Pain in cancer patients - Definitions

- Unpleasant sensory and emotional experience associated with actual or potential tissue damage

- The amount of suffering or “total Pain” experienced by an individual will be determined by physical, psychological, social and spiritual factors
Pain is whatever the experiencing person says it is, existing whenever he or she says it does.
Pain in cancer patients - Definitions

Pain can be classified broadly into two categories:

- Nociceptive
- Neuropathic
Pain in cancer patients - Definitions

**Nociceptive**: peripheral nociceptors → non-myelinated C sensory fibers and small A\(\delta\) fibers → dorsal root ganglion → spinothalamic pathways → thalamus and various higher centers in the brain

- Visceral → diffuse aching back pain associated with carcinoma of the pancreas
- Somatic → soft tissue pain or bone
- Bone pain → tenderness in a localized area, or pain initiated by movement in a load bearing bone
Neuropathic: Pain transmitted from damaged neural tissue in either the peripheral or central nervous system

- Pathophysiology involves NMDA receptor-channel complex
- Burning or shooting ± allodynia, autonomic changes
- Intermittent or continuous
- Brachial plexopathy caused by metastatic lymph nodes in the axilla.
Pain in cancer patients - Definitions

- **Breakthrough pain:**
  - Episodic surge in otherwise well controlled pain
  - May be due to “end-of-dose failure”

- **Incident pain:**
  - Breakthrough pain
  - Due to voluntary movement
Despite publication of the WHO guidelines for managing cancer pain nearly two decades ago, management of cancer pain still presents a challenge in everyday practice.
Causes of undertreated pain

- **Patients’ Factors:** Reluctance to talk about pain, morphine related fear of sedation, addiction, implied poor prognosis
- **Physician’s factors:** Training frequently lacking during the years as medical student, Reluctance to prescribe morphine
✓ Inclusion of pain training programs in the curriculum of medical students
✓ Post graduate education programs
Pain in cancer patients—Challenges

- 75% of cancer patients have multiple pains\(^1\)
- The interactions between cancer pain, insomnia, fatigue, and depression/anxiety are complex\(^2\)
- In general, the health care system does a poor job of assessing pain
- The most common cause of poor pain control remains failure to properly assess

\(^1\)Banning A et al. Pain 1991
\(^2\)Theobald DE. Clinical cornerstone 2004
Pain in cancer patients-Assessment

General principles

• Extensive history and a thorough physical examination

• Initial evaluation, at regular intervals during treatment, and whenever new therapy is initiated to gauge the success of analgesics

• Changes in severity of pain → serious → progression of the disease

• Patients should be encouraged to report pain without having to resort to emotional outbursts or hostility

• Routine use of pain assessment tools

1-Davis MP and Walsh D. Cancer Diagnosis and Management 2004
Pain in cancer patients-Assessment
Why caregivers underrate pain?

- Pain is multidimensional, it affects body, mind, and spirit
- Its complexity makes it hard to measure
- The intensity of pain correlates poorly between patient's self-assessment and caregivers' assessment
- The greater the intensity of pain the poorer the correlation

Pain in cancer patients-Assessment

Why some patients do not complain of pain?

- Fear of being perceived as complainers
- Fear that reporting pain will draw attention away from treating the cancer
- Fear that increasing pain means progressive cancer
- Belief that pain is natural part of having advanced cancer
- Fear of adverse effects of analgesics
- Fear of “using up” opioids too early leaving no means of future pain relief
- Worry about the cost of treatment
- Wish to avoid disturbing family members
Pain in cancer patients - Assessment tools

Unidimensional tools

- Verbal rating scale (VRS)
- Visual analog scale (VAS)
- Numerical rating scale (NRS)
Pain in cancer patients - Assessment tools

Multidimensional tools

- Comprehensive multidimensional pain assessment tools were developed to assess and measure the effect of pain on mood, activities, and quality of life
- More difficult for patients to complete
Pain in cancer patients - Assessment tools

Multidimensional tools

- McGill pain questionnaire
- Memorial pain assessment card
- Wisconsin brief pain questionnaire
Pain in cancer patients-Assessment

- Breakthrough pain must be assessed independently
- May be incident or spontaneous
- Associated with more intense pain, more impaired functional status, worse mood, greater anxiety
- Require independent opioid dosing
Pain in cancer patients - Assessment

- While thorough physical examination is of paramount importance, information from lab tests or imaging are rarely helpful with pain assessment and treatment.
- In terminally ill patients for whom all therapeutic options have been exhausted symptom management alone is more appropriate.
To help assess pain at home:

- **Physicians** should keep assessing pain on a regular basis
- **Patients** should keep a pain diary
Pain in cancer patients - Assessment

Pain diary, 4-day period, 3 times daily

Advantages:

- Memory of pain not reliable, diary more accurate
- Compliance with daily recording is high
- Improve coping skills, limit phone calls
- Improve communication of pain without overt pain behaviors
Pain in cancer patients - Assessment

Summary

- Pain is what the patient reports
- Believe the patient
- Measure and systematically record
Therapeutic choices - Principles

Prevent pain recurrence → Use fixed dosing based on effective T1/2 of drug
PRN DOSING WITH RECURRENT PAIN

Modified from Meizak Sci Amer 262:27, 1990

CNS or RESPIRATORY DEPRESSION

GOOD PAIN CONTROL

RECURRENT PAIN

TIME, HOURS

4 8 12 16

Plasma Drug Concentration
FIXED DOSES BASED ON $T_{1/2}$

Modified from Melzak Sci Amer 262:27, 1990

CNS or RESPIRATORY DEPRESSION

GOOD PAIN CONTROL, MINIMAL SIDE EFFECTS

Plasma Drug Concentration

RECURRENT PAIN

TIME, HOURS

3

6

9

12
DO NOT STOP THE TREATMENT...
...TREAT THE SIDE EFFECTS (opioids)

- Nausea, stomach upset, vomiting
- Itching, hives
- Constipation
- Depression – Sleepy, down, slow breathing
- Amnesia, delirium, personality change
Therapeutic choices - Principles

- Nausea, vomiting, sedation, itching → Patient will become tolerant

- Constipation → Stool softeners, Laxatives

A bowel regimen must be begun coincident with the initiation of opiates

“The hand that prescribes morphine should prescribe stool softeners”
Therapeutic choices - Principles

Breakthrough pain require independent opioid dosing
Therapeutic choices - WHO Ladder

- First published in 1986
- Gold standard for managing advanced cancer pain
- 80% to 90% of cancer pain can be successfully managed using the WHO approach
## Therapeutic choices - Adjuvants

### Step 1

<table>
<thead>
<tr>
<th>DRUG CLASS</th>
<th>GENERIC NAME</th>
<th>ACTION</th>
<th>SIDE EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticonvulsants</td>
<td>Carbamazepine, Clonazepam, Gabapentin, Phenytoin</td>
<td>Help to control tingling or burning from nerve injury caused by the cancer or cancer therapy.</td>
<td>Liver problems and lowered number of red and white cells in the blood. Gabapentin may cause sedation and dizziness.</td>
</tr>
</tbody>
</table>

- Nonopioid ± Adjuvant

Mild pain
Therapeutic choices - Weak opioids

- Efferalgan codeine - Dafalgan codeine - Solpadeine
- Diantalvic – Algophene-Zaldiar-Tramal
Therapeutic choices - Strong opioids

- Meperidine
- Morphine (IV) - Morphine sustained release (PO)
- Durogesic - Fentanyl congeners
Now available

MST CONTINUS® Tablets – the progressive approach

• A wide range of bioequivalent tablets

Every 12 hours

MST CONTINUS®
Morphine Sulphate BP
Controlled Release Tablets

Dignity preserved...
### Therapeutic choices - Do we have the choice?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Codeine</td>
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<tr>
<td>2.</td>
<td>Oxycodone</td>
</tr>
<tr>
<td>3.</td>
<td>Hydrocodone</td>
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<tr>
<td>4.</td>
<td>Buprenorphine</td>
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<tr>
<td>5.</td>
<td>Nalbuphine</td>
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<tr>
<td>6.</td>
<td>Hydromorphone</td>
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<tr>
<td>7.</td>
<td>Levorphanol</td>
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<tr>
<td>8.</td>
<td>Methadone</td>
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<tr>
<td>9.</td>
<td>Morphine (IV) different concentrations</td>
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<tr>
<td>10.</td>
<td>Morphine sustained release (PO)</td>
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<tr>
<td>11.</td>
<td>Morphine elixir</td>
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<tr>
<td>12.</td>
<td>Oxycodone</td>
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<tr>
<td>13.</td>
<td>Meperidine</td>
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<tr>
<td>14.</td>
<td>Morphine sustained release (PO)</td>
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<tr>
<td>15.</td>
<td>Durogesic</td>
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<tr>
<td>16.</td>
<td>Oxymorphone</td>
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<tr>
<td>17.</td>
<td>Fentanyl congeners</td>
</tr>
</tbody>
</table>

1. Codeine
2. Meperidine
3. Fentanyl congeners
4. Morphine (IV)
5. Morphine sustained release (PO)
6. Durogesic
7. Tramadol
Therapeutic choices-Opioid rotation

- The occurrence of uncontrolled side-effects or non-responsiveness to opioid therapy → Opioid rotation
- Better tolerance
- Lower doses
Side effects

- Itching
- Excessive Nausea & vomiting
- Non responsiveness

Efficacy
Side effect management opens the therapeutic window and allow increase of the dose to a therapeutic level
Psychostimulant drugs (methylphenidate)

- Multimodal analgesia
  (Non-opioids, adjuvants: ↓doses of opioids)

- Opioid rotation
- Interventional techniques

Efficacy

Side effects
Most cancer pain (80 to 90% of patients) effectively controlled using conventional analgesics and adjuvants according to the principles of the WHO analgesic ladder for cancer pain relief.
Efficacy of WHO guidelines examined in 401 patients at the time of death:

- 3% severe or very severe pain
- 52% had no pain at all
- 24% mild/moderate pain
- 20% unable to rate pain
Analgesic drugs mainstay of therapy during last 24 hr of life:

<table>
<thead>
<tr>
<th>Route</th>
<th>by mouth 47%</th>
<th>parenterally 44%</th>
<th>no systemic analgesics required 9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>nonopioid analgesics alone 5%</td>
<td>nonopioids and &quot;weak&quot; opioids 16%</td>
<td>&quot;strong&quot; opioids alone or in combination with nonopioids 70%</td>
</tr>
</tbody>
</table>
• Study shows that cancer pain can be treated satisfactorily until death using pharmacological measures
• Nonpharmacological measures, such as radiotherapy, nerve blocks or neurosurgery played only a very minor role at this stage of the disease
Systemic analgesics fail to provide adequate control of cancer pain in a small but significant percentage of cancer patients:

- intolerable adverse effects of drug therapy
- intractable cancer pain in advanced disease
• When the strategy of “opening the therapeutic window fails”
• Reserved for the refractory 10-20%
Interventional treatment of cancer pain:
The fourth step in the WHO analgesic ladder
1. Paracetamol and/or NSAIDs

2. Opioids for mild to moderate pain
   ± Non-opioids
   ± Adjuvant drugs
   e.g. Codeine

3. Opioids for moderate to severe pain
   ± Non-opioids
   ± Adjuvant drugs
   e.g. Morphine, oxycodone

4. Interventional therapy
   ± Non-opioids
   ± Adjuvant drugs
   e.g. Neurolytic blocks, spinally-administered opioids
Therapeutic choices—Non pharmacological, Non Invasive approaches

- Palliative radiotherapy
- Physiotherapy (Spinal or limb bracing techniques)
- Acupuncture
- Psychological (Cognitive behavioral therapy, relaxation therapy)
New Age mumbo jumbo? Not for millions of Americans who meditate for health and well-being. Here's how it works.

THE SCIENCE OF MEDITATION

Actress Heather Graham has been practicing Transcendental Meditation since 1991.
Therapeutic choices-Invasive

<table>
<thead>
<tr>
<th>Category</th>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthetic</td>
<td>Neuraxial infusion</td>
<td>Epidural or intrathecal infusion of opioids, local anesthetics and other drugs; temporary nerve blocks, neurolytic blocks</td>
</tr>
<tr>
<td></td>
<td>Neural blockade</td>
<td></td>
</tr>
<tr>
<td>Surgical</td>
<td>Neurodestructive lesions</td>
<td>Cordotomy, mesencephalotomy and cingulotomy</td>
</tr>
<tr>
<td>Neurostimulatory</td>
<td>Superficial</td>
<td>Transcutaneous electrical nerve stimulation</td>
</tr>
<tr>
<td></td>
<td>Invasive</td>
<td>Dorsal column stimulation</td>
</tr>
<tr>
<td>Palliative surgery</td>
<td>Invasive</td>
<td>Stabilization of spine</td>
</tr>
<tr>
<td></td>
<td>Non-invasive</td>
<td>Percutaneous vertebroplasty</td>
</tr>
</tbody>
</table>
Choice of Technique

- The life expectancy of the cancer patient is an important consideration for selection of an appropriate interventional technique.

- Risk/Benefit ratio of intervention.
Choice of Technique

- Analgesia for several days to a few weeks (Epidural)
- Analgesia for a few months (neurolytic blocks)
- Analgesia for several years (implantable drug delivery devices)
- Implantable devices more appropriate with life expectancy at least 1 to 2 years
Choice of Technique

- Regional analgesic techniques (neuraxial opioid and local anaesthetic administration), are considered first because they do not compromise neurological integrity.

- Ablative or neurodestructive procedures (narrow risk-benefit ratio) should be deferred as long as analgesia can be achieved with non-ablative modalities.
Choice of Technique

- Some procedures (celiac plexus blockade in pancreatic cancer) have a favorable risk benefit ratio that warrant early treatment with neurolysis
Choice of Technique

• Other factors:
  - patient’s expectations
  - availability of local expertise and trained staff

An appropriately chosen procedure can reduce the requirement for systemic opioid and improve the quality of life
Central Neuraxial Block

After identification of opioid receptors in the spinal cord in 1973, delivery of drugs by the epidural or intrathecal route for analgesia have been used.
Central Neuraxial Block

- Percutaneous epidural (external syringe pump)
- Intrathecal catheter (totally implanted intrathecal drug delivery (ITDD) system)
Central Neuraxial Block

The principal indication for ITDD in cancer patients (*The European Association of Palliative Care)*:

- Failure to achieve satisfactory analgesia despite escalating doses of strong opioids
- Severe dose limiting side effects

Epidural Infusion Analgesia

- Cancer patients often have abnormal coagulation & compromised immune function
- At risk of hematoma and infection: near absolute CI to EPD catheter placement normally
- Decision is through discussion with patient & family of benefits (↓ pain, opioid, side effects) against potential risks
Comparative efficacy of epidural, subarachnoid, and intracerebroventricular opioids in patients with pain due to cancer (Review)

Ballantyne JC, Carwood C

Jan 25 (1), 2005
• Data from uncontrolled studies reported excellent pain relief among 73% of ICV patients compared with 72% EPI and 62% SA

• Neuraxial opioid therapy is often effective for treating cancer pain that has not been adequately controlled by systemic treatment.
Main results

Data from uncontrolled studies reported excellent pain relief among 73% of ICV patients compared with 72% EPI and SA. Unsatisfactory pain relief was low in all treatment groups. Persistent nausea, persistent and transient urinary retention, transient constipation occurred more frequently with EPI and SA. Respiratory depression, sedation and confusion were most frequent with ICV. The incidence of major infection when pumps were used with EPI and SA was zero. There was a lower incidence of complications with ICV therapy than with EPI or SA.

Authors' conclusions

Neuraxial opioid therapy is often effective for treating cancer pain that has not been adequately controlled by systemic opioids. However, long-term use of neuraxial therapy can be complicated by problems associated with the catheters. The data from uncontrolled studies suggests that ICV is at least as effective against pain as other neuraxial treatments and may be a successful treatment for patients whose cancer pain is resistant to other treatments.
The principal drug used is an opioid (morphine)
Addition of a LA improves efficacy
Clonidine can be added
Starting dose estimated by calculating the total opioid dose taken by the patient including breakthrough pain doses
Then converted to the equivalent epidural dose of morphine (10:1 parenteral-to-epidural morphine)
Epidural Infusion Analgesia

- Duration is classically weeks
- Epidural analgesia can be used for up to many months (with silastic catheters)
Epidural Infusion Analgesia

- Volume/doses of epidural drugs > intrathecal route
- Reservoir capacity of implanted pump is limited: external syringe pump is used
- Pump refilling may increase the risk of infection → monitor for signs of infection frequently
- Refractory pain with life expectancy > 3 to 6 mo: trial of epidural analgesia to assess effectiveness of pain relief before implantable ITDD system
Implanted epidural using percutaneous silastic catheter (DuPen catheter)
With good community support and caregiver education, patients can go home with epidural catheters.
Intrathecal Analgesia with ITDD System

- Intrathecal infusion uses a lower dose and volume compared to an epidural infusion
- Most physicians use a 10:1 epidural-to-intrathecal morphine dose conversion
- Longer interval between pump refills when using a fully internalized pump system
Intrathecal Analgesia with ITDD System

- Entirely implanted ITDD system may offer the advantage of a lower infection risk.

- Intrathecal catheters are safer when they need to be in use for more than 3 weeks.

- If life expectancy short (several days to weeks), external pumps & epidural cath more appropriate.

- After placement of implanted ITDD pump → continuing care (pump program changes and refill sessions).
INTRATHecal ANALGESIA with iTDD SYSTEM-complications

- Catheter-related (wound infection, meningitis, microfracture/breakage, malposition, migration, hygroma, blockage from fibrosis, catheter tip granulomas)

- Pump-related (unexpected battery depletion, motor or component failure and program error)

- Drug-related (neurotoxicity and permanent neurological damage)

- Procedure-related (postdural puncture headache, hematoma, injuries to surrounding structures)
Intrathecal infusion analgesia more cost-effective than systemic medication beyond 3 to 6 months for cancer pain.

Cost analysis (Bedder et al):
- external pump system if patient’s survival expected to be < 3 months
- intrathecal catheter with an internalized pump with longer life expectancy
Drugs Administered Intrathecally - Opioids

- Morphine current gold standard for IT administration, only opioid approved by FDA for IT delivery to treat chronic pain

- Hydromorphone, a semisynthetic hydrogenated ketone of morphine, 5 times more potent, more lipophilic, faster than morphine

- May be used when intolerance to IT morphine

- Morphine: first line for intrathecal analgesia, hydromorphone: alternative first-line to morphine
Drugs Administered Intrathecally—Local anesthetics

- Bupivacaine acts synergistically with morphine, reducing the need for increases in intrathecal morphine dose

- Clinically relevant side effects are usually not seen at bupivacaine doses of less than 15 mg per day
Drugs Administered Intrathecally-
Alpha-2 adrenoceptor agonist

- Used in combination with morphine and/or bupivacaine
- Acts synergistically with opioids
- Shown to be effective in patients with cancer pain
Intrathecal Neurolysis

- Prior to actual procedure, a diagnostic block using a LA agent to assess the efficacy of intended neurolytic procedure.

- This block is also useful to evaluate possible neurological deficits that can result from the ablation.

- Advantages: fewer follow-ups compared to continuous neuraxial drug delivery and greater cost-effectiveness for patients with short life expectancy.

- Complications: permanent motor loss, paresthesia, dysesthesia.
Intrathecal Neurolysis

- Neurolytic agents into the subarachnoid space
- Goal: segmental block, purely sensory, without any motor weakness
- Used agents: alcohol 50%-100%, phenol 7%-12%
- Alcohol hypobaric: semi-prone position (face down and affected side up at 45° angle)
- Alcohol settles near the dorsal root ganglia and produce a sensory blockade
- Phenol hyperbaric: opposite position (face up with the affected side down at 45° angle)
Intrathecal Neurolysis-Problems

- Inadequate pain control with progression of tumor
- Short duration of effect
- Weakness of lower limb muscles
- Rectal or bladder sphincter dysfunction
Intrathecal Neurolysis-Candidates

- Short life expectancy (less than 1 year)
- Intractable, well-localized cancer pain
- Best results are obtained when intrathecal neurolysis is used for somatic pain
- 78% to 84% with somatic pain had favorable response, good pain control in only 19% to 24% with visceral pain (Gerbershagen HU. Neurolysis. Subarachnoid neurolytic blockade. Acta Anaesthesiol Belg 1981;32:45-57)
Sympathetic Blocks

- Several sites can be blocked to treat cancer pain from visceral organs

- Neurolysis is performed in almost all of the sympathetic blocks as catheter placement is difficult and impractical

- Celiac plexus for pain from upper abdominal cancers

- Superior hypogastric plexus for pain from pelvic organs such as ovaries, bladder and prostate

- Ganglion impar block effective for anal or vaginal cancer pain.
CERVICOThORACIC GANGLIA
Brain, meninges, eye, ear, tongue, pharynx, larynx, glands and skin of head, neck and upper extremity

THORACIC GANGLIA
Mediastinal contents, esophagus, trachea, bronchi, pericardium, heart, thoracic aorta, pleura, lung

CELIAC PLEXUS
GI tract (distal esophagus to mid-transverse colon), liver, adrenals, ureters, abdominal vessels

LUMBAr GANGLIA
Skin and vessels of lower extremity, kidney, ureters, transverse colon, testes

HYPOGASTRIC PLEXUS
Descending and sigmoid colon, rectum, vaginal fundus, bladder, prostate, prostatic urethra, testes, seminal vesicles, uterus and ovaries

GANGLION IMPAR
Perineum, distal rectum and anus, distal urethra, vulva and distal third of vagina
Celiac Plexus Block

- Situated retroperitoneally in the upper abdomen, at the level of the T12 and L1 vertebral bodies
- Surrounds the abdominal aorta and the celiac and superior mesenteric arteries
- Gives the autonomic nerves supplying the liver, pancreas, gallbladder, stomach, spleen, kidneys, intestines and adrenal glands
- Efficacy of celiac plexus neurolysis in the management of abdominal cancer pain has been evaluated in multiple trials
Percutaneous approach
bilateral injection into
region of celiac plexus

Diaphragm
Spine (L1)
Liver
IVC
Panc.
Celiac nerve plexus

Kidney
Spleen
Stomach
Neurolytic Celiac Plexus Block for Treatment of Cancer Pain: A Meta-Analysis

E. Eisenberg, MD*, D. B. Carr, MD†, and T. C. Chalmers, MD‡
*Department of Neurology, Massachusetts General Hospital and Harvard Medical School, and Pain Relief Clinic, Rambam Medical Center, Haifa, Israel; and †Department of Anesthesia and ‡Division of Clinical Care Research, Department of Medicine, New England Medical Center and Tufts University School of Medicine, Boston, Massachusetts
Celiac plexus blocks long-lasting relief for 70% to 90% of patients with pancreatic and other upper abdominal cancers

Adverse effects are common but transient and mild

Severe adverse effects are uncommon
Celiac Plexus Block - Complications

- Postural hypotension
- Diarrhea
- Pneumothorax
- Retroperitoneal hematoma
- Paraplegia due to an acute ischemic myelopathy (probable involvement of the artery of Adamkievicz).
- Spreading of neurolytic solution posteriorly can sometimes affect the lower thoracic and lumbar somatic nerves → potential neuropathic pain
Peripheral Nerve Blocks

- Useful when pain occurs in the territory of one or more peripheral nerves

- Role as sole or main modality for cancer pain limited: most of these patients experience pain at multiple sites, especially with advanced disease

- In combination with other concurrent therapy, allows relief of one component of a patient’s overall pain state
Peripheral Nerve Blocks

- Alcohol or phenol are used for PNB blocks
- Alcohol can produce painful dysesthesia when injected around myelinated nerves
- Phenol is much less painful on injection and is a better option for peripheral nerve neurolysis
- Other modes of neurodestruction include radiofrequency ablation and cryoablation
Peripheral Nerve Blocks

- Advances in infusion pump and catheter technology more interest in use of LA for PNB

- Nerve stimulation or US as aids to nerve identification and catheter placement has made nerve blocks easier with better analgesic outcome

- Distorted neuroanatomy by tumor invasion or radiation can be overcome by using real-time visualization with US guidance
Peripheral Nerve Blocks

*PNB that have been reported:*

- Femoral nerve block
- Sciatic nerve block
- Brachial plexus block
- Suprascapular block
- Psoas compartment block
- Distal lumbar plexus block
- Paravertebral block
- Interpleural blocks
Conclusions-I

- Oral opioids and adjuvants remain the mainstay of cancer pain management
- Intolerable side effects and treatment failure are the main limitations
- Improved efficacy of interventional techniques has widened the physician’s armamentarium to combat intractable cancer pain
- These procedures should be considered during patient assessment, individualized and employed as soon as their necessity becomes clear
Conclusions-II

Future plans should aim at

- Increasing pain education and awareness among health care providers
- Broadening the spectrum of opioids available in Lebanon
- Overcoming legal barriers that restrict availability of opioids for pain patients
Pain is a more terrible lord of mankind than even death itself

Schweitzer

Thank You