Trends in Oncology Vol 6 Issue 1 2024

Original Research Article

Open Access

Omniscient Pte.Ltd.

The Efficacy and Safety Analysis of Opioid Analgesics in the Treatment of Pain in Elderly Patients with Malignant Tumors and Cancer Pain

Wen-Juan Feng*

***Correspondence to:** Wen-Juan Feng,Baoji High-tech Hospital,Baoji City, Shaanxi Province,721000,China,E-mail:13991576674@163.com

Abstract:Objective: To investigate the efficacy and safety of opioid analgesics in the treatment of pain in elderly patients with malignant tumors and cancer pain. **Methods:** 108 cases of malignant tumor patients admitted to our hospital from March 2022 to December 2023 were selected as the research subjects. Opioid analgesics such as codeine, hydrocodone, fentanyl, methadone, tramadol, and morphine were used for analgesia, and the analgesic effect and safety were analyzed. **Results:** The pain of patients was relieved and improved compared to before treatment, and the differences in the comparison results were statistically significant ($P < 0.05$). The types of adverse reactions included dizziness, nausea and vomiting, somnolence, respiratory depression, etc. The total incidence rates of adverse reactions with four or more drugs were 11.11%, 7.41%, 6.48%, and 8.33%, respectively, and the comprehensive incidence rate of adverse reactions was 47.22%. **Conclusion:** Analgesic treatment for elderly patients with malignant tumors and cancer pain can be selected according to the category of drugs, which can effectively improve and alleviate the level of pain. However, various adverse reactions are prone to occur, so medication should be used cautiously and appropriate types of drugs should be selected according to the patient's condition.

Keywords: Opioid analgesics; Elderly malignant tumors; Cancer pain; Analgesic treatment

Malignant tumor patients often experience accompanying pain symptoms, and the majority of pain cannot be effectively relieved. Persistent and widespread pain poses a serious threat to the quality of life, mental state, and nutritional status of cancer patients [1]. Currently, there is no effective method for treating cancer pain, and analgesic drugs are often used to alleviate pain. However, once the effect of the medication wears off, the patient's pain may reappear. There are many drugs clinically used to relieve cancer pain, such as non-steroidal drugs, central drugs, and anesthetic drugs, each with different mechanisms of action. Opioid drugs are a type of anesthetic drug primarily derived from opium poppies. They act on specific receptors in the central nervous system, blocking pain transmission and improving pain, and are commonly used for severe pain, especially cancer pain caused by malignant tumors. In order to further understand the efficacy and safety of opioid drugs in relieving cancer pain, a study was conducted.

1. Data and Methods

1.1 General Information

A total of 139 cases of malignant tumor patients admitted to our hospital from March 2022 to December 2023 were selected as the research subjects. Inclusion criteria: ① Elderly patients meeting the staging criteria for malignant tumors [2]; ② Age ⩾ 60 years old; ③ Patients with cancer pain and a disease course ⩾ 3 months; ④ Signed informed consent form. Exclusion criteria: ① Patients with cognitive, mental, and communication disorders; ② Patients allergic to opioid drugs; ③ Patients with impaired liver and kidney metabolic function; ④ Patients with weak tolerance. General patient information is shown in **Table 1**.

Table 1 General Patient Information

Number		Age (years)	Average Age (years)	Type					
Male	Female			Gastric Cancer	Colorectal Cancer	Breast Cancer	Pancreatic Cancer	Lung Cancer	Others
74	65	60~83	65.32±2.57	28	23	40	7	30	11

1.2 Methods

Opioid analgesics were used for pain management, starting with the lowest dosage and increasing the dosage if pain worsened, with each increment not exceeding 25%. The specific types of drugs and their usage methods were as follows:Codeine: Available in 15mg tablets. Initial dose was 1 tablet. If pain persisted for more than 3 episodes and each episode lasted over 5 minutes, an additional 1/4 tablet could be added. Dosage should be controlled within 60mg if possible. Duration of action: 4-6 hours. Metabolism time: 12 hours.Hydrocodone: Initial dose for intramuscular or subcutaneous injection was 1-2mg every 2-3 hours. For intravenous injection, initial dose was 0.1-1mg every 2-3 hours. Duration of action: 2-3 hours. Metabolism time: 24 hours.Fentanyl: Initial dose was 25ųg, gradually increased to 50ųg. Tolerant patients could increase the dosage further from 50ųg.Methadone: Subcutaneous or deltoid injection, single dose of 5-15mg, not exceeding 30mg. Increase in dosage should be done every 6-8 hours. Duration of action: 15-18 hours. Metabolism time: 24 hours.Tramadol: Oral administration of 50mg per dose, 2-3 times daily. Effective within 10-20 minutes. Duration of action: 4-8 hours. Metabolism: Over 80% in 24 hours.Morphine: 10-20mg daily. Duration of action: 2.5-3.5 hours. Metabolism time: 24-36 hours.

1.3 Observational Indices

Pain Relief Effect: Reference was made to the NRS[3] and CCPAT [4], combined with the actual situation of cancer inpatients in our hospital to develop a pain assessment scale. Pain assessment scores ranged from 0 to 10, with higher scores indicating higher pain levels. Scores of 0-3 indicated mild pain, 4-7 indicated moderate pain, and 8-10 indicated severe pain.

Safety: Types and frequencies of adverse reactions occurring during medication were recorded. Adverse reaction incidence rate = number of adverse reactions / sample size × 100%.

1.4 Statistical Analysis

Statistical analysis of research results data was performed using SPSS 23.0 software. Measurement data and count data were represented by ±s and (n, %), respectively. The t-test and chi-square test were used to test for differences. A significance level of $P < 0.05$ was considered statistically significant.

2. Results

2.1 Comparison of Pain Relief Effects

After using codeine, hydrocodone, fentanyl, methadone, tramadol, and morphine, patients' pain was significantly improved ($P < 0.05$). See **Table 2**.

Table 2. Comparison of Pain Relief Effects[$N = 108$, $\overline{\chi} + s$]

Drug Type	Number	Before Treatment	After Treatment	*t*	*P*
Codeine	26	6.87±0.57	4.65±0.57	14.043	0.000
Hydrocodone	29	6.85±0.49	4.71±0.48	16.801	0.000
Fentanyl	31	6.91±0.51	4.46±0.52	18.729	0.000
Methadone	22	6.89±0.47	4.53±0.49	16.303	0.000
Tramadol	14	6.83±0.53	4.68±0.54	15.302	0.000
Morphine	17	6.91±0.49	4.51±0.49	16.758	0.000

2.2 Safety Evaluation

Adverse reactions after taking codeine, hydrocodone, fentanyl, methadone, tramadol, and morphine are shown in **Table 3**.

Table 3. Safety Evaluation [*n*, %]

Drug Type	Number	Dizziness	Nausea/ Vomiting	Somnolence	Respiratory Depression	Others	Total
Codeine	26	3(11.54)	2(7.69)	3(11.54)	1(3.85)	5(19.23)	14(53.85)
Hydrocodone	29	4(13.79)	1(3.45)	1(3.45)	3(10.34)	4(13.79)	13(44.83)
Fentanyl	31	3(9.68)	3(9.68)	2(6.45)	2(6.45)	4(12.90)	14(45.16)
Methadone	22	2(9.09)	2(9.09)	1(4.55)	3(13.64)	2(9.09)	10(45.45)
Tramadol	14	1(7.14)	1(7.14)	2(14.29)	2(14.29)	1(7.14)	7(50.00)
Morphine	17	2(11.76)	2(11.76)	1(5.88)	2(11.76)	1(5.88)	8(47.06)

3. Discussion

Malignant tumors result from the malignant proliferation of cells in the body. Due to the rapid proliferation of malignant tumors, they quickly occupy the positions of normal cells in organs and tissues, affecting the normal activities of cells in the body, thereby directly or indirectly causing pain. Among them, 50-80% of pain cannot be effectively controlled [5]. Classification of cancer pain according to its causes can be divided into directly caused cancer pain, indirectly caused cancer pain, and pain caused by treatment drugs. Direct cancer pain mainly results from the malignant proliferation of tumors, which occupy and compress surrounding cells, tissues, organs, and nerves. Under pressure, the body feels pain. Examples include bone pain caused by bone metastasis, chest pain and pleural pain caused by lung cancer, and others. Indirectly caused pain is mainly influenced by the decline in the body's immune function. During the malignant tumor proliferation process, a large amount of nutrients is required. Due to the rapid proliferation of cancer cells, most nutrients in the body are absorbed by cancer cells, affecting the supply of nutrients to normal cells, resulting in malnutrition and weakened immune function in the body. This leads to decreased resistance to various inflammations, which in turn causes pain. Pain caused by treatment mainly includes pain caused by radiotherapy and chemotherapy, such as radiation neuritis, oral mucositis, skin erythema, and venous thrombosis caused by chemotherapy drugs, among others.

Opioid drugs are a type of analgesic drug belonging to the category of anesthetics, primarily extracted from opium poppies. After processing, various types of analgesics are obtained. Currently, widely used opioid drugs in the market include codeine, hydrocodone, fentanyl, methadone, among others [7]. These drugs have important applications in severe cancer pain. Codeine is a white crystalline powder with a analgesic effect of 1/12 to 1/7 of morphine. Its bioavailability is 40-70%, and peak blood concentration is reached 1 hour after oral administration. Adverse reactions may occur if a single dose exceeds 50mg, including excitability, respiratory depression, and bradycardia. Hydrocodone is a semi-synthetic derivative of morphine with certain analgesic effects. The steady-state volume of distribution after intravenous injection is 302.9L, accounting for about 31%, and the plasma protein binding rate is 8-19%. It is cleared 2-3 hours after injection. Fentanyl has an analgesic effect 80 times that of morphine. It takes effect 1 minute after intravenous injection, with peak blood concentration reached after 4 minutes, and lasts for 1-2 hours. Methadone takes effect 30 minutes after administration, with a duration of action of 24-36 hours, providing a long-lasting analgesic effect. Tramadol takes effect within 10-20 minutes, with a duration of action of 4-8 hours, and over 80% metabolism within 24 hours. Morphine has a duration of action of 2.5-3.5 hours and a metabolism time of 24-36 hours. Overall, the above opioid drugs can all improve pain, but their analgesic effects vary. The choice of which drug to use depends on the patient's specific situation.

References

[1] Li Y, Zhang Y, Zhang L, et al. Impact of physician-pharmacist joint outpatient clinics and the "three-level follow-up method" on the efficacy and safety of moderate to severe cancer pain patients[J/OL].

Medical Bulletin, 1-10[2024-02-27].

[2] Wen Y, Wei Y, Li X, et al. Sichuan expert consensus on clinical practice norms of patient-controlled intravenous analgesia technology for cancer pain patients[J]. *Cancer Prevention and Treatment*, 2024, 37(01): 1-19.

[3] Chang W, Sun Y, Liu Z. Comparison of the effects of hydrocodone and morphine titration-controlled intravenous analgesia on cancer pain patients[J]. *Aerospace Medicine*, 2024, 35(01): 60-62.

[4] Yang C, Zhu Z, Chen Y, et al. Long-term high-dose hydrocodone PCIA treatment of refractory cancer pain in a patient with advanced osteosarcoma[J]. *Chinese Journal of Pain Medicine*, 2024, 30(01): 79-80.

[5] Li X, Pan X, Zhao Y, et al. Comparison of opioid demand between Wa and Han cancer pain patients: a single-center retrospective study[J]. *China Rational Drug Use Exploration*, 2024, 21(01): 87-91.