

Responses of lung cancer survivors undergoing gamma knife surgery to supportive group psychotherapy

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Abstract

An increasingly important concern for clinicians who care for patients with cancers is their psychological problems and quality of life. The present study examined the efficacy of supportive group psychotherapy (SGP) on anxiety, depression and overall quality of life in patients with lung cancer undergoing gamma knife surgery (GKS).

160 patients with lung cancer undergoing GKS were randomly divided into SGP group (n=82) and care as usual (CAU) group (n=78). Patients in SGP group received 90 minutes' group psychotherapy intervention once a week for 8 weeks, while patients in CAU group received usual care. Outcome measures were administered before and after the intervention and at 3-months follow-up. The primary outcome measures were the 14-item Hospital Anxiety and Depression Scale (HADS) and the secondary outcome measures were the 30-item European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30 (EORTC QLQ-C30).

Demographic characteristics between SGP and CAU groups showed no difference in sex, age, course of disease, years of education, marital status and profession. Psychological characteristics evaluated by HADS revealed that levels of both depression and anxiety in SGP group were significantly improved compared with that in CAU group at the end of the treatment and the improvement remained at the 3-months follow-up. In addition, EORTC QLQ-C30 demonstrated that functional scales including emotion, cognition and society in SGP group were significantly higher than that in CAU group at the end of the treatment and maintained till 3-months follow-up. EORTC QLQ-C30 also showed that symptom scales including fatigue, nausea/vomiting, pain, sypnea, insomnia, loss of appetite and financial problems in the former group were significantly lower than that in the latter group and maintained till 3-months follow-up. Furthermore, compared with that in SGP group before treatment, these variables in both HADS and EORTC QLQ-C30 showed obvious improvement in the same group after treatment and at the 3-months follow-up.

The results suggested that SGP can alleviate anxiety and depression in patients with lung cancer following GKS and improve the overall quality of life.

Abbreviations: CAU = care as usual, EORTC QLQ-C30 = 30-item European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30, GKS = gamma knife surgery, HADS = hospital anxiety and depression scale, SGP = supportive group psychotherapy.

Keywords: anxiety, depression, gamma knife surgery, lung cancer survivors, supportive group psychotherapy

1. Introduction

Patients with cancer frequently suffer from psychological problems such as depression and anxiety.^[1] These problems has been associated with reduced quality of life, greater mortality,

decreased adherence to anticancer therapies, worse satisfaction with care and increased healthcare costs.^[2,3]

Lung cancer is one of the most malignant cancers, responsible for 17.6% of total cancer-related deaths. Despite recent advances in treatment, lung cancer has a poor survival rate with only 15% of overall 5-year survival rate, even in well developed countries.^[4,5] Similar to other cancer patients, patients with lung cancer also have psychological problems including depression and anxiety. Patients with lung cancer are commonly older adults living in the deprived areas and have multiple medical comorbidities especially in China.^[6,7] They often suffer rapid and severe physical deterioration and they are aware of their poor prognosis. It is therefore unsurprising that they also suffer an especially high rate of depression and anxiety.

There is strong evidence that supportive group psychotherapy (SGP) intervention for cancer patients improves the quality of life, reduces the psychological distress, enhances the coping skills and attenuates the distress associated with symptoms such as pain.^[8] Early researches revealed that 1-year SGP reduced psychological distress and improved quality of life for patients with metastatic cancer and dying patients and patients with the terminally ill.^[9-11] China is a developing country with undeveloped development of SGP for cancers. It has some barriers among cancer survivors to

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accessing psychosocial support including a sense of stigma preventing them from seeking mental health service; the failure of healthcare providers to ask about emotional distress; a lack of awareness among survivors of available resources and not believing they require mental health services.

Given that the patients with lung cancer undergoing gamma knife surgery (GKS) have psychological problems which negatively affect their quality of life, the present study was designed to examine the efficacy of SGP on anxiety, depression and overall quality of life in these patients in order to improve their quality of life and reshape the hope of the life. The results showed that SGP can alleviate anxiety and depression in patients with lung cancer following GKS and improve the overall quality of life.

2. Method

2.1. Participants

Lung cancer patients undergoing GKS were recruited from No. 323 Hospital of People's Liberation Army, Xi'an, China between March, 2017 and March, 2018. Eligible patients were diagnosed with stage III or IV lung cancers over 18 years old, who were treated with GKS. Participants needed for psychological help/support for a psychosocial problem (e.g., anxiety, depression, coping issues, and life questions) and had ability to attend all therapy sessions. Patients were excluded if they had significant cognitive impairment or psychosis and had current psychological treatment. Prospective participants were informed of the risks and benefits of study participation and provided written informed consent. The study was approved by the Ethics Review Committee of No. 323 Hospital of People's Liberation Army, China. 160 patients were randomly divided into SGP group ($n = 82$) and care as usual (CAU) group ($n = 78$). Patients in SGP group received 90 minutes' group psychotherapy intervention once a week for 8 weeks, while patients in care as usual (CAU) group received usual care. Patients in SGP group were randomized in groups of 8 to 10. The lost numbers in SGP group are 2 and 5 after treatment and at 3-months follow-up respectively, while lost numbers in CAU are 3 and 6 respectively. Outcome measures were administered before and after the intervention and at 3-months follow-up. The primary outcome measures were the 14-item Hospital Anxiety and Depression Scale (HADS) and the secondary outcome measures were the 30-item European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30 (EORTC QLQ-C30).

The HADS is a 14-item self-assessment scale for measuring distress with 2 subscales, anxiety and depression. The HADS was specifically designed for use in the medically ill.^[12]

The 30-item EORTC QLQ-C30 (version 3.0) includes a global HRQOL scale (2 items) and comprises 5 functional scales: physical functioning (5 items), role functioning (2 items), emotional functioning (4 items), cognitive functioning (2 items) and social functioning (2 items). There are 3 symptom scales (nausea and vomiting (2 items), fatigue (3 items) and pain (2 items) and 6 single items relating to dyspnoea, insomnia, loss of appetite, constipation, diarrhoea and financial difficulties.^[12]

2.2. Supportive group psychotherapy

Based on the seminal work of Cain et al,^[13] SGP program was developed formal models of group psychological interventions in cancer survivors. The SGP was conducted by 2 accredited

psychologists, once per week for 90 minutes. Each weekly session was based around 8 themes, reflecting the ongoing needs of cancer survivors.^[14,15] The themes were:

1. exploration of life stories,
2. implications of living with cancer,
3. stress coping,
4. mindfulness and feeling anxious,
5. relationships and support,
6. self-identity,
7. hope, and
8. moving forward.

Each SGP session included opportunity for individual expression, group discussion, teaching, and problem solving.^[13,16,17] The proposed benefits of participating in these experiences together were creating a sense of belonging and normalcy, sharing and reshaping their identities, feeling a sense of mutual aid, and creating hope by comparison of coping success.

2.3. Care as usual

Cancer survivors assigned to the CAU group did not participate in the group interventions. If a participant requested psychological care, he or she was referred to the physician general practitioner.

2.4. Statistical analysis

The initial analysis of treatment effects was conducted within treatment groups using matched *t* tests. ANOVA was used to evaluate whether the treatment effects observed differed across the 2 groups. Post hoc tests were used to break down the 3 time points (before treatment, after treatment and 3-months follow-up), by contrasting before treatment and after treatment and 3-months follow-up. Descriptive analyses and chi-square tests of association were used as appropriate to analyze sample characteristics. $P < .05$ was considered significantly different.

3. Results

3.1. Demographic characteristics of lung cancer survivors undergoing GKS between GSP and CAU groups

One hundred Sixty lung cancer patients who received GKS were randomly into SGP and CAU groups, having 82 and 78 cases respectively (Table 1). Each group has even gender distribution with 42 (51.2%) males in SGP group and 43 (55.1%) males in CAU group respectively ($\chi^2 = 0.245$, $P = .620$). The mean ages are 61.4 years in SGP group and 59.4 years in CAU group respectively ($t = 1.420$, $P = .158$). No significant differences in years of education among 3 periods (less than 10 years, 10–12 years and more than 12 years) are found between 2 groups ($\chi^2 = 0.855$, $P = .651$). Similarly, marital status and profession also showed no significant difference between 2 groups ($\chi^2 = 0.599$, $P = .439$ for marital status and $\chi^2 = 0.778$, $P = .371$ for profession respectively).

3.2. Psychological characteristics of lung cancer survivors undergoing GKS between GSP and CAU groups

Depression and anxiety are the main psychological problems for lung cancer survivors. Therefore, HADS was used to assess the status of depression and anxiety before and after treatment and at the 3-month follow-up in 2 groups. As shown in Table 2, the scores

Table 1
Demographic characteristics of lung cancer survivors.

Characteristic	SGP (n=82)		CAU (n=78)		χ^2	t	P
	Mean or No.	SD or %	Mean or No.	SD or %			
Sex					0.245		.620
Male	42	51.2	43	55.1			
Female	40	48.8	35	44.9			
Age (years)	61.4	9.2	59.4	8.3		1.420	.158
Course of disease (months)	14.5	8.3	12.4	4.7		1.968	.135
Years of education					0.855		.651
Less than 10	46	55.3	40	51.2			
10–12	19	23.5	17	22.3			
More than 12	17	21.2	21	26.5			
Marital status					0.599		.439
Married	74	95.3	73	93.6			
Single	8	4.7	5	6.4			
Profession					3.54		.371
Worker	31	38	28	36			
Farmer	42	51	37	47			
Civil servant	9	11	13	17			

CAU=care as usual, SGP=supportive group psychotherapy.

of depression and anxiety are comparable between SGP and CAU groups before treatment (56.4 vs 60.4, $P = .356$ for depression and 60.1 vs 59.5, $P = .452$ for anxiety, respectively). However, the depression scores in SGP group after treatment decreased significantly compared with that before treatment (20.9 vs 56.4, decreased by 62.9%, $P < .05$), which continuously kept stable till the 3-month follow-up. Similarly, the anxiety scores in SGP group after treatment reduced significantly compared with that before treatment (23.1 vs 60.1, reduced by 61.6%, $P < .05$), which continuously kept stable till the 3-Month Follow-Up. These results suggested that group psychotherapy intervention is an effective approach for patients with lung cancer survivors who received GKS to improve their depression and anxiety. On the contrary, the scores of both depression and anxiety in CAU group revealed no significant changes among before, after treatment and at 3-month follow-up. Expectedly, scores of both depression and anxiety in SGP group reduced significantly compared with that in CAU group after treatment (20.9 vs 52.4, $P = .001$ for depression and 21.6 vs 53.4, $P = .001$ for anxiety) and at 3-month follow-up (23.1 vs 53.8, $P = .001$ for depression and 22.4 vs 52.3, $P = .001$ for anxiety).

3.3. Functional and symptomatic characteristics of lung cancer survivors undergoing GKS between GSP and CAU groups

Functional and symptomatic problems always negatively affect the life of quality of lung cancer survivors. Thereafter, EORTC QLQ-C30 was employed to evaluate the status of functional and symptomatic characteristics before and after treatment and at the

3-month follow-up in 2 groups. As shown in Table 3, the scales of all functional and symptomatic variables demonstrated comparable between 2 groups before treatment. However, the function scales including emotion, cognition and society in SGP group after treatment increased significantly compared with that before treatment (49.3 vs 29.3, $P = .005$ for emotion, 67.3 vs 34.0, $P = .001$ for cognition and 65.0 vs 28.3, $P = .024$ for society, increased by 68.3%, 97.9%, and 129.7%, respectively). These results suggested that group psychotherapy intervention for 8 weeks significantly improves these functions of lung cancer survivors. Furthermore, the improvement remained at 3-month follow-up. On the contrary, patients in CAU group showed no improvement of these functions after treatment and at 3-month follow-up compared with that before treatment. In addition, the symptom scales including fatigue, nausea/vomiting, pain, dyspnea, insomnia, loss of appetite, and financial problems in SGP after treatment and at 3-month follow-up significantly decreased compared with that before treatment. On the contrary, patients in CAU group showed no changes in these symptom scales after treatment and at 3-month follow-up.

4. Discussion

In the present study, we found that SGP intervention attenuates the depression and anxiety and improves the functional and symptomatic characteristics in patients with lung cancer undergoing GKS. These results are consistent with the reports revealing that SGP lessens anxiety and depression and builds up global quality of life in 31 patients with advanced cancer in

Table 2
Psychological characteristics of lung cancer survivors.

Variable	Before treatment, Mean (SD)			After treatment, Mean (SD)			3-Month Follow-Up, Mean (SD)		
	SGP (n=82)	CAU (n=78)	P	SGP (n=80)	CAU (n=75)	P	SGP (n=77)	CAU (n=72)	P
Depression	56.4 (8.1)	60.4 (13.1)	.356	20.9* (3.9)	52.4 (4.1)	.001	21.6* (4.6)	53.4 (5.4)	.001
Anxiety	60.1 (6.9)	59.5 (6.25)	.452	23.1* (6.5)	53.8 (7.5)	.001	22.4* (7.6)	52.3 (8.2)	.001

The data was expressed as Mean (SD).

CAU=care as usual, SGP=supportive group psychotherapy.

* $P < .05$ compared with SGP group before treatment.

Table 3
Functional and symptomatic characteristics of lung cancer survivors (Mean (SD)).

Variable	Before treatment, Mean (SD)			After treatment, Mean (SD)			3-Month Follow-Up, Mean (SD)		
	SGP (n=82)	CAU (n=78)	P	SGP (n=80)	CAU (n=75)	P	SGP (n=78)	CAU (n=72)	P
Function scales									
Emotional function	29.3 (7.3)	31.7 (7.9)	.225	49.3* (12.3)	34.0 (8.5)	.005	46.3* (10.3)	35.0 (9.5)	.004
Cognitive function	34.0 (8.5)	26.7 (6.7)	.305	67.3* (16.8)	33.3 (10.8)	.001	62.3* (12.8)	35.3 (10.8)	.001
Social function	28.3 (7.1)	31.7 (7.9)	.365	65.0* (14.8)	38.3 (10.1)	.024	68.0* (15.8)	35.3 (11.1)	.014
Symptom scales									
Fatigue	75.0 (18.8)	71.7 (17.9)	.452	39.7* (9.9)	65.7 (16.4)	.012	42.7* (10.9)	61.7 (15.4)	.016
Nausea/vomiting	75.0 (18.8)	78.7 (19.7)	.315	48.3* (12.1)	77.0 (19.3)	.005	45.3* (10.1)	72.0 (20.3)	.003
Pain	71.7 (17.9)	75.0 (18.8)	.245	50.3* (12.6)	68.3 (17.1)	.030	45.3* (13.6)	61.3 (16.1)	.035
Dyspnea	68.3 (17.1)	62.0 (15.5)	.412	35.0* (8.8)	53.3 (10.8)	.034	38.0* (9.8)	58.3 (11.8)	.024
Insomnia	65.0 (16.3)	62.3 (15.6)	.315	21.7* (5.4)	56.7 (9.2)	.002	25.7* (6.4)	48.7 (10.2)	.042
Loss of appetite	60.0 (15.0)	61.7 (15.4)	.325	25.0* (6.3)	53.3 (10.8)	.007	28.0* (7.3)	63.3 (13.8)	.005
Constipation	56.7 (14.2)	48.3 (12.1)	.256	35.0 (8.8)	38.3 (9.6)	.225	38.0 (9.8)	41.3 (10.6)	.215
Diarrhea	48.3 (12.1)	41.7 (10.4)	.225	40.0 (10.0)	38.3 (9.6)	.149	42.0 (11.0)	34.3 (8.6)	.119
Financial problems	85.0 (21.3)	83.3 (20.8)	.254	62.0* (15.5)	77.3 (19.3)	.015	58.0* (14.5)	71.3 (18.3)	.035

The data was expressed as Mean (SD).

CAU=care as usual, SGP=supportive group psychotherapy.

* P<.05 compared with SGP group before treatment.

China^[18] and that SGP improves self-efficacy, quality of life, symptom distress, communication and uncertainty of patients with prostate cancer and their partners in the United Kingdom.^[8]

Lung cancer patients generally bear the pressure of surgery, follow-up treatment and the poor prognosis. Long-term stress leads to anxiety, depression and other negative emotions.^[7] Studies showed that the prognosis of malignant tumors is closely related with the emotional changes. Negative emotion reduces the immunity of the patients, promotes the proliferation of cancer cells and enhances the metastasis. Therefore, the necessary psychological intervention should be taken to improve the unhealthy psychological state of lung cancer patients and improve their quality of life.

SGP was based on the model developed by Cain et al^[13,19] and manualized by Payne et al^[20] The 8 weekly 90-minutes sessions focused on discussion of issues themes that emerge for patients coping with cancer. Utilizing a supportive approach, therapists focused on encouraging patients to share concerns related to the cancer diagnosis and treatment, to describe their experiences and emotions related to these experiences, voice problems that they have in coping with cancer, and offer support and advice to other group members. Each SGP session included opportunity for individual expression, group discussion, teaching, and problem solving.^[13,16,17] The proposed benefits of participating in these experiences together were creating a sense of belonging and normalcy, sharing and reshaping their identities, feeling a sense of mutual aid, and creating hope by comparison of coping success.

Group cohesion of SGP is an effective therapeutic force.^[19,20] A safe and receptive group environment allows each patient to talk freely about topics that they can't talk about with their families and medical staff and to share and overcome their fears as well as to face the threat of disease to their lives. The present study showed that in initial phase of group therapy, most of the patients talk about optimistic ideas, making the treatment difficult. Under the guidance of a psychotherapist, a woman patient finally cried out in fear of death, which took the group therapy a big step forward. With the progress of treatment, the warmth of the group dissolves their loneliness and helplessness. At the end of the group, many patients were reluctant to leave the group and would try their best to help other patients. The efficacy

was proven by our finding that the scores of both depression anxiety in SGP group after treatment decreased by 62.9% and 61.6%, respectively compared with that before treatment, both continuously kept stable till the 3-month follow-up. These results suggested that group psychotherapy intervention is an effective approach for patients with lung cancer survivors who received GKS to improve their depression and anxiety. Similarly, Wu and Wang reported that supportive psychotherapy reduces the depression and anxiety in 63 patients with lung cancer by 55.3%.^[21]

Regarding the long-term (after 3 months of follow-up) effect of SGP for the patients with lung cancer following GKS, our experience revealed that the depression and anxiety of the patients were still significantly reduced and the ability of life adaptation was significantly improved. We also found that the patients' desire for survival was stimulated, the compliance of treatment was improved and the endurance of pain was enhanced. This is because

1. the patients fully express their problems and shares their views with other members through group therapy;
2. they get support from each other and feel improved self-worth and
3. they have witnessed the success of other members and tried to reshape the hope of life.

Besides the close association between severity of lung cancer with depression and anxiety, Pompili et al reported that patients affected by chronic and disabling conditions that are even comorbid with psychiatric disorders are usually nonadherent to mood disorders medications.^[22] Specifically, the authors identified several predictors of nonadherence among patients with mood disorders including younger age, comorbidity with substance use and personality disorders, patients' beliefs, poor insight, illness severity, treatment-related side effects, specific features of the disease and a poor therapeutic alliance.^[22] The authors concluded that given the high social, clinical and economic impact of nonadherence among patients who are affected by mood disorders, it is critical to recognize patients at high risk of nonadherence in order to inform future strategies to examine and improve adherence to treatment.

The present study has several limitations. Firstly, the sample size of patients is relatively small. Secondly, the study is based on one center. Lastly, this study is focusing on the lung cancer patients instead of variety of cancers. These limitations can be solved in the future by increasing the sample size, expanding to multi-centers investigation and to other cancers.

5. Conclusion

The present study has suggested that SGP can alleviate anxiety and depression in patients with lung cancer following GKS and improve the overall quality of life. This study is of clinical significance for effectively using SGP to treat the psychological and functional problems for cancer patients.

Author contributions

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