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CHEMICAL PLEURODESISFOR RECURRENT SYMPTOMATIC MALIGNANT PLEURAL EFFUSION VIA PIGTAIL CATHETER VERSUS CHEST TUBE

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Abstract: Objectives: -Compare between pigtail catheter (12 Fr) and chest tube (28 Fr) in management of recurrent symptomatic malignant pleural effusion in patients who underwent chemical pleurodesis regarding 30-days effusion control rate, pain during insertion and pleurodesis and complication rate. Methods: -172 patients with recurrent symptomatic malignant pleural effusion included in this study were randomly distributed between two groups then underwent chemical pleurodesis by bleomycin then followed up after 30 days. Age, sex distribution and primary pathology were incomparable between the two groups. Results: -Group (1) experienced pain score measured by Visual Analogue Scale for Pain (VAS) during insertion 1.67 ± 0.72 while Group (2) had mean 3.82 ± 1.69 with (p value < 0.001), while pain during pleurodesis in Group (1) was 3.69 ± 0.78 while in Group (2) was 3.91 ± 1.16 with p value = 0.13,Recurrence during 30 days were 30.09 % in Group (1) and 37.68% in Group (2). Conclusions: -Chemical pleurodesis for recurrent symptomatic malignant pleural effusion by bleomycin via pigtail catheter in comparison to chest tube showed superior 30-day effusion control rate with less pain during insertion and pleurodesis with less complications apart from blockage

Keywords: Malignant pleural effusion, chemical pleurodesis, pigtail catheter, bleomycin.

INTRODUCTION

Malignant pleural effusion is a common complication for some malignancies that affect nearly 15% of cancer patients [(1)] for which prevention of recurrence is one of the important goals. Classically insertion of chest tube followed by chemical pluerodesis was the standard of care. Now with the shifting towards the pigtail catheter insertion and indwelling pleural catheters, efficacy of chemical pluerodesis is a matter of conflict.

Some considerthat the wide bore of chest tube allows wider spread of the chemical agent while others owe to the spontaneous pleurodesis effect mentioned by some authors to just need some augmentation by the chemical agent[(2-5)].

Many centers also consider pigtail catheter insertion and follow up as an outpatient procedure with low possibility of complications during insertion and less cost of hospital stay while

chest tube insertion classically needs hospital admission during insertion and at least few hours after insertion under observation [5-8].

PATIENTS AND METHODS

This is a comparative prospective study that took place between March 2017 and September 2020. During this period, 172 patients with malignant pleural effusion were randomized between two groups: -

Group (1) underwent pigtail catheter insertion (12 Fr) for malignant pleural effusion with assessment of pain score during insertion using Visual Analogue pain Scale (VAS) followed by daily recording of drainage until drainage is less than 100ml/day followed by chemical Pleurodesis with assessment of pain score using VAS analogue.

Group (2) underwent chest tube (28 Fr) insertion for malignant pleural effusion with assessment of pain score during insertion using VAS followed by daily recording of drainage until drainage is less than 100 ml/day followed by chemical Pleurodesis with assessment of pain score using VAS.

Both groups were instructed for lie down for half an hour on each side to try to achieve uniform distribution of bleomycin.

Approval of ethical committee was obtained. Declaration of Helsinki was followed regarding trials on humans[9].

The main indication in both groups was recurrent symptomatic malignant pleural effusion with no lung entrapment to be suspected.

All patients had coagulation profile, radiological proof of recurrence of pleural effusion by either chest x ray or computed tomography.

Cases with continuous high drainage or entrapped lung who were unfit for pleurodesiswere excluded similar to cases lost during follow up after pleurodesis. Cases with previous insertion of pigtail catheter or chest tube with or without pleurodesiswereexcluded.

Success is considered by absence of recurrence of symptomatic pleural effusion after one month in the follow up.

Pleurodesis was done using bleomycin(60 mg) as sterile talc was not available in our country and bleomycin is the preferable agent in malignant pleural effusion in our center.15 ml of lidocaine 2% was added standard to every procedure then pain management was done according to severity of pain for each case after scoring the severity of pain.

Age and sex distribution among both groups were comparable. Group (1) included 103 patients 64 females (62.13%) and 39 males (37.87%) with age range between 26 - 73 years (mean 58.29 ± 9.78).Group (2) included 69 patients 45 females (65.21%) and 24 males (34.78%) with age range 27-69 years (mean 56.32 ± 8.26).Distribution of the primary pathology between the two groups demonstrated in Table (1).

RESULTS

Our study included 172 patients all of which had recurrent symptomatic radiologically proven malignant pleural effusion. Chemical agent used with its dose and local anesthetics used was unified among both groups.

Pain assessment during insertion and injection of pleurodesis was done using visual analogue pain scale(VAS) where 0 represents no pain and 10 represents the most severe unbearable pain.
During insertion, Group (1) experienced pain score 1.67 ±0.72 while Group (2) experienced pain score with mean 3.82 ± 1.69 with *(p value < 0.001)* which is considered highly statistically significant.

During pleurodesis pain score in Group (1) was 3.69 ± 0.78 while in Group (2) was 3.91 ± 1.16 with *p value = 0.13,* which although higher than group (1) is considered statistically non significant.

Complications observed during insertion and before pleurodesis were summarized in Table (2).

After 30 days of pleurodesis patients were reassessed for recurrence of symptomatic effusion during this period which would be considered in this study as failure. During follow up of Group (1), 72 patients (69.9%) did not suffer from symptomatic pleural effusion while 31 patients (30.09%) needed intervention for recurrent symptomatic pleural effusion.

While in group (2) 43 patients (62.31%) did not suffer from recurrent symptomatic pleural effusion while 26 patients (37.68%) experienced recurrent symptomatic pleural effusion that needed intervention.

DISCUSSION

Recent studies and reports worldwide show tendency towards shifting the management that need pleural drainage towards the smaller size chest tubes, indwelling catheters or pigtailcatheters favoring less pain, complications, better tolerance, patient satisfaction, lower cost and hospital stay especially for malignant pleural effusion and hepatic hydrothorax [10,11].

However, management should be tailored for each pathology, consequent procedure required and patient condition to achieve best results and know the pros and cons for each technique.

Breast cancer and bronchogenic carcinomawere the primary pathology in 46.51 % of our patients which were also the main primary pathology of malignant pleural effusion in many other studies like Trembly et al [2] where bronchogenic carcinoma was the primary pathology in 32.1 % and breast cancer was 27.5% (collectively 59.6 %) ,also Mendes et al [12] in Portugal had very high incidence of bronchogenic carcinoma as the primary pathology of malignant pleural effusion in his study 62.29%.

High incidence of breast cancer as a primary pathology explains the higher incidence of malignant pleural effusion occurrence in females than males. In our study Group (1) had 64 females (62.13%), Group (2) had 45 females (65.21%) with total 63.37%

Age range inGroup (1) was between 26 - 73 years (mean 58.29 ± 9.78) while Group (2) had age range 27-69 years (mean 56.32 ± 8.26). which go with the fact that oncological diseases

with their sequences are more prevalentin older age groups similar to the age group in Mendes et al [12] which was 67 (58-78 years).

Regarding the complications observed at both groups after insertion are mentioned in details in Table (2), Most of the complications like pain after insertion, empyema, cellulitis at site of insertion, Loculation, vasovagal syncope during insertion and wound infection after removal were higher in Group (2), the only complication that was higher in group (1) is blockage owing to the narrower caliber of pigtail catheter.

These results are similar to many studies comparing chest tube insertion with pigtail catheter insertion likeNadimSorrour[13] study over 361 patients where he found higher incidence of complications like dislodgment, bleeding, tumor seeding, pain requiring catheter removal, transient respiratory deterioration, ARDS, fever, subcutaneous emphysema higher at the chest tube group while cellulitis and fluid leakage more at pigtail cathetergroup.

Visual Analogue Scale for pain (VAS) was used in a trial to assess and compare pain at time of insertion and at time of pleurodesis. During insertion, Group (1) experienced pain score 1.67 ± 0.72 while Group (2) experienced pain score with mean 3.82 ± 1.69 with *(p value < 0.001)* which is considered highly statistically significant and could be easily explained due to narrower caliber causing less trauma to skin, chest wall and pleura.

While pain during pleurodesis assessed using the Visual Analogue Scale for pain (VAS) was in Group (1) was 3.69 ± 0.78 while in Group (2) was 3.91 ± 1.16 with *p value = 0.13*, which although higher than group (1) is considered statistically non significant. This result similar to the study made in England by Rahman MN et al [14] who made 2x2 study studying pain related to pleurodesis during management of malignant pleural effusion who found pain less in the pigtail catheter group equivalent to 2.2 versus 2.68 in the chest tube group but with *p value* = 0.04 which is considered statistically significant.

During follow up of Group (1), 72 patients (69.9%) did not suffer from symptomatic pleural effusion while 31 patients (30.09%) needed intervention for recurrent symptomatic pleural effusion. While in group (2) 43 patients (62.31%) did not suffer from recurrent symptomatic pleural effusion while 26 patients (37.68%) experienced recurrent symptomatic pleural effusion that needed intervention which show near similar results for recurrence with slightly better results inthe pigtail catheter group. Similar comparable results were found in Mendes et al series [12] where recurrence after 4 weeks occurred in 14.3% of chest tube group and 23.1% in pig tail catheter group. While another study estimated recurrence after pleurodesis via pigtail catheter at 20%[10].

CONCLUSION

Chemical pleurodesis for recurrent symptomatic malignant pleural effusion by bleomycin via pigtail catheter in comparison to chest tube showed superior 30-day effusion control rate with less pain during insertion and pleurodesis with less complications apart from blockage.

Funding
No Funding.

Conflict of interest
I declare no conflict of interest in this study.

Table (1) Distribution of primary pathology between the two groups.

	Group (1)		Group (2)	
Breast	26	25.24%	18	26.08%
Bronchogenic	22	21.35%	14	20.28%
Colorectal	13	12.62%	11	15.94%
Hepatoma	11	10.67%	8	11.59%
Ovary	9	8.73%	7	10.14%
Lymphoma	8	7.76%	5	7.24%
Mesothelioma	8	7.76%	4	5.79%
Others	6	5.82%	2	2.89%

Table (2) Complications related to the route of delivery of chemical pleurodesis.

	Group (1)		Group (2)	
Pain after insertion	8	7.76%	17	24.63%
Empyema	2	1.94%	8	11.59%
Catheter site cellulitis	4	3.88%	7	10.14%
Blockage	9	8.73%	3	4.34%
Loculation	4	3.88%	7	10.14%
Vasovagal during insertion	0	0%	3	4.34%
Wound infection after removal	2	1.94%	5	7.24%

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