



## A COMPARATIVE STUDY ON ASSESSMENT OF POSTOPERATIVE SHOULDER FUNCTION, IN HEAD AND NECK CANCER.

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**ABSTRACT** In India, head and neck cancers constitute 10-15% of all malignancies. A critical prognostic factor in head and neck cancers is spread of disease to regional lymph nodes and the presence or absence of even microscopic extra capsular spread. In India, head and neck cancers constitute 10-15% of all malignancies. A critical prognostic factor in head and neck cancers is spread of disease to regional lymph nodes and the presence or absence of even microscopic extra capsular spread. Although functional superiority of SAN preserving neck dissection is established, any nerve sparing neck dissection can still be associated with some functional disability<sup>3-10</sup>. The present study is aimed to compare shoulder function in different neck dissections with or without flap reconstruction.

### KEYWORDS

#### Material and method

The present study is a Descriptive analytical Study.

#### 1. Source of data

In our study, 147 patients who were seeking medical attention in SAMC & PGI, were registered. Out of 147 patients, 71.4% were males & 28.8% were females. Among 147 patients, 55.8% of patients belonged to age group of 40 yrs to 60 yrs. Patients above 80 yrs were not included in our study. The data was collected on the pre-structured proforma under all inclusions and exclusions criteria.

#### 2. Method of data collection

##### Inclusion Criteria:

All the patients presenting to Department of Surgical oncology at SRI AUROBINDO MEDICAL COLLEGE AND POST GRADUATE INSTITUTE, INDORE and who satisfied the inclusion criteria was studied between Feb 2015 and Feb 2017

1) Histologically proven head and neck malignancy with or without clinically palpable neck nodes, who underwent surgery for primary and neck dissection as treatment.

2) Pre-Op Neo-adjuvant CT+RT

##### Exclusion Criteria:

- 1) Patient with previous major ipsilateral neck surgery.
- 2) Patient going for salvage surgery because of radiotherapy failure.
- 3) Neurological disorder.
- 4) Poor performance status.

#### SAMPLE SIZE & STATISTICAL ANALYSIS PLAN :

Based on the study conducted by, Sheikh A I, Shallwani H, Ghaffar S, approximately 147 patients were taken for the study of similar type.

- Unpaired t test will be applied to observe significance between means of variable.

The p value will be obtained. A p value of < 0.05 will be taken as a significant difference and a p value > 0.05 will be taken as non-significant difference.

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TABLE NO.1

GENDER	NUMBER	PERCENTAGE
MALE	105	71.4%
FEMALE	42	28.8%

Out of 147 patients, 71.4% were male & 28.8% were female.

TABLE NO.2

AGE GROUPS	NUMBER	PERCENTAGE
40-50	44	29.9%
51-60	38	25.9%
61-70	39	26.5%
70-80	26	17.7%

Among 147 patients, 55.8% of patients belong to age group of 40yr to 60yr.

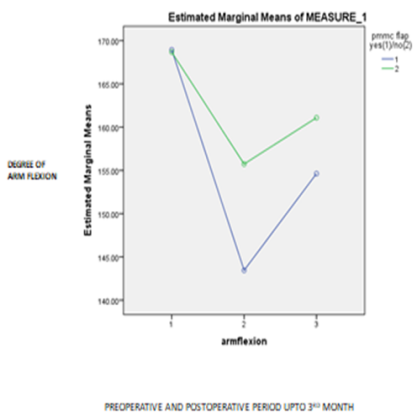
TABLE NO.4

#### COMPARISON OF RANGE OF MOTION IN DIFFERENT TYPES OF NECK DISSECTION

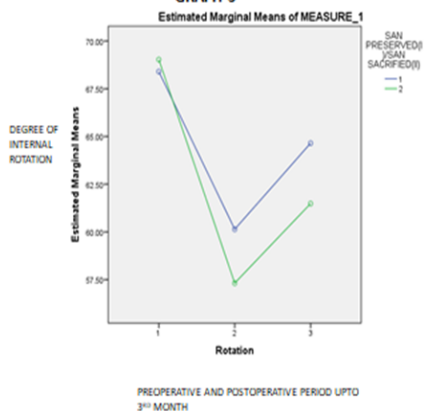
RANGE OF MOTION	MRND	SOHND	RND	P VALUE
ARM FLEXION-POD-7 <sup>th</sup>	148.86±7.8	158.40±3.56	145.91±8.852	0.0001
ARM FLEXION-POD-1 <sup>st</sup> MONTH	158.43±6.16	164.20±2.62	153.91±7.373	0.0001
INTERNAL ROTATION-7 <sup>th</sup> DAY	58±10.17	64.67±2.46	55±4.966	0.001
INTERNAL ROTATION-1 <sup>st</sup> MONTH	63±3.4	67.07±1.28	61.22±4.295	0.001
PERCENTAGE DIFFERENCE OF ABDUCTION 1 <sup>st</sup> WK	25.1±10	12.44±6.2	39.53±8.3	0.001
PERCENTAGE DIFFERENCE OF ABDUCTION 1 <sup>st</sup> WK	19.3±9.8	8.8±4.4	34.51±6.5	0.0001
PERCENTAGE DIFFERENCE OF ABDUCTION 1 <sup>st</sup> WK	11.94±7.5	4.92±4.4	21.86±4.6	0.0001

SHOULDER FUNCTION WERE BETTER IN GROUP OF SOHND FOLLOWED BY MRND FOLLOWED BY RND. THIS CHANGE WAS FOUND TO BE STATISTICALLY SIGNIFICANT (P VALUE 0.001 & 0.0001).

GRAPH 2



GRAPH-3



**Discussion**

In our study 147 patients were registered in SAIMS & PGI. Out of 147 patients, 71.4% were males & 28.8% were females. Among 147 patients, 55.8% of patients belonged to age group of 40 yrs to 60 yrs. Patients above 80 yrs were not included in our study.

After proper investigations, staging & metastatic workup, surgery was planned for patients. 74% of the patients underwent MRND (modified radical neck dissection), 14% of the patients underwent radical neck dissection and 12% of the patients underwent selective neck dissection.

Out of 147 patients, in 66.7% spinal accessory nerve was preserved, with meticulous neck dissection without leaving any nodal tissue while cleaning and dissecting entire course of nerve. Nerve was sacrificed in 33.7% cases, main cause being the presence of nodal mass in the vicinity of the nerve. During nerve dissection gentle traction over the nerve was given. Small vessels accompanying with nerve were also preserved while dissection. A branch to sternocleidomastoid was cut when muscle was also to be sacrificed. Gentle traction was required to make dissection easy & to inflict as little injury as possible to nerve fibers.

Out of 147 patients, in 57.1%, cases PMMC flap was used for reconstruction. 42.9% cases were treated with other methods of reconstruction. In group with nerve preservation, PMMC flap was used in 56% cases & in group without nerve preservation, PMMC flap was used in 44% of the patients.

Percentage change in the range of abduction was more in the group where the spinal accessory (Group 2) nerve was sacrificed as compared to group where spinal accessory nerve was preserved (Group 1). Percentage change in range of abduction in Group 1 was 19.12±6.7 in 1<sup>st</sup> week. After proper exercise and efforts, percentage change in range of abduction was improved in 1<sup>st</sup> month (14.21±6.1), and maximum range of abduction was achieved in 3<sup>rd</sup> month of follow up with percentage change of 8.6±5.6. In Group 1, mean range of abduction was improved to (163.17±9.8) in 3<sup>rd</sup> month of follow up with proper

exercise and effort.

Percentage change in Group 2 was 40.11±7.9 in 1<sup>st</sup> week, after proper exercise and efforts, percentage change in the range of abduction was improved to (33.41±8.0), but difference was found to be more as compared to Group 1 (14.21±6.1) at regular follow up of 1<sup>st</sup> month. In Group 2, percentage change in degree of abduction was (21.1±5.9), but difference was found to be more as compared to Group 2(8.6±5.6) at regular follow up of 3<sup>rd</sup> month after proper physiotherapy. In Group 2, abduction was improved with mean of (140.7±10.7) which was found to be lower than that of Group 1(163.17±9.8) at regular follow up of 3<sup>rd</sup> month. This difference in percentage change was found to be statistically significant (p value <0.0001). On applying Greenhouse-Geisser test range of abduction was significantly reduced in Group 2 as compared to Group 1, in 1<sup>st</sup> week. This indicates that neck dissection has the greatest impact on shoulder abduction in cases where we preserve Spinal Accessory Nerve. The difference in impact can be explained by the fact that the Trapezius muscle is active during abduction.

The type and extent of dissection is dictated by the tumor site, size and stage. However, when possible, surgery should be as selective as possible to reduce shoulder pain and restriction in abduction. Additionally a modified neck dissection preserving the XI Nerve in a clinical positive node does not adversely affect survival; however any residual nodal tissue should not be left.

Percentage change of abduction in group of SOHND was (12.44±6.2) in 1<sup>st</sup> week, this difference was found to be statistically significant in comparison of MRND & RND (25.1±10 & 39.53±8.3 respectively) with p value of <0.001. In group of SOHND, this change in abduction was thought because of neuropraxia due to traction over nerve fibers. However application of electromyography & nerve conduction test is necessary to prove this difference. With proper exercise & efforts this difference was improved in each group. Percentage difference of abduction was 4.92±4.4 in SOHND, 11.94±7.5 MRND, 21.86±4.6 RND in 3<sup>rd</sup> month. This change in difference found to be statistically significant value<0.001. So in group where nerve was preserved, difference in degree of abduction gradually improved and reached near to normal range of abduction, but in group where nerve was sacrificed, improvement was less even after 3<sup>rd</sup> month of follow up and this difference was found to be statistically significant value <0.001.

Similar to abduction in 1<sup>st</sup> week, mean range of arm flexion was higher in group of SOHND (158.40±3.562), followed by MRND (148.86±7.8) & RND (145.91±8.852). After proper exercise and efforts, at 3<sup>rd</sup> month, mean range of arm flexion was 164.20±2.624 in group of SOHND, 158.43±6.16 in group of MRND, 153.91±7.373 in group of RND. Mean difference of 1<sup>st</sup> week and 3<sup>rd</sup> month was found to be statistically significant between each group, with p value<0.001. It is possible that during non-selective procedures, but with preservation of the Nerve XI, the nerve loses its conductive function temporarily due to stripping of the nerve from its surrounding tissues resulting in a neurapraxia. This neurapraxia may recover in the post clinical phase.

Similarly mean of internal rotation at first week was highest in SOHND (64.67±2.46), followed by MRND (58±10.17) & RND (55±4.966). At 3<sup>rd</sup> week after proper exercise & efforts, mean of internal rotation was (67.07±1.28) in group of SOHND, 63±3.4 in group of MRND, 61.22±4.295 in group of RND. Difference of means of different groups was found to be statistically significant with p value <0.001.

In group where we preserved spinal accessory nerve, percentage change of abduction & mean of flexion and internal rotation was found to be statistically significant as compared to group where we sacrificed spinal accessory nerve.

In cases, where we preserved spinal accessory nerve, SPADI score was 28.65±17.46. In group where we sacrificed spinal accessory nerve, SPADI score was 70.88±13.53. In group where we preserved spinal accessory nerve, if we used PMMC flap for reconstruction, SPADI score was found to be 32.79±18.59, but if PMMC flap was not used, SPADI score was 24.84±15.57. This difference was found to be statistically significant, p value <0.024. In group where we sacrificed spinal accessory nerve, if we used PMMC flap for reconstruction, SPADI score was found to be 70.24±15.09, but if PMMC flap was not used, SPADI score was 72.83±7.09. This difference was found to be

statistically not significant, p value < 0.570

Comparison of SPADI score between the two groups was also found to be statistically significant with p value < 0.001.

Thus selective dissection is a protective factor for shoulder pain compared to nonselective dissections. This finding is in agreement of Nowak et al who found that reconstruction using a pectoral myocutaneous flap reduced range of motion of the cervical spine and forward flexion of the shoulder.

Weakness of our study was that the contribution of cervical plexus was not included. Electromyography & nerve conduction test should have been included as a nerve function assessment, especially in cases of neuropraxia, mainly seen in cases of selective and modified radical neck dissection.

## CONCLUSION

For our study, total of 147 patients were registered in SAMC & PGI. Out of 147 patients, 71.4% were males & 28.8% were females. 55.8% of patients belonged to age group of 40 yrs to 60 yrs. The cut-off age limit for our study was 80 yrs.

Proper history was taken. Examination, Investigations and metastatic workup was done on all 147 of patients and consequentially surgery was planned. Following were the choices of surgery which was performed along with the percentage of candidates that went through that particular surgery. 74% of the patients underwent MRND (modified radical neck dissection), 14% of the patients underwent radical neck dissection and 12% of the patients underwent selective neck dissection.

Out of 147 patients, in 57.1%, cases PMMC flap was used for reconstruction. 42.9% cases were treated with other methods of reconstruction. In group with nerve preservation, PMMC flap was used in 56% cases & in group without nerve preservation, PMMC flap was used in 44% of the patients.

Patients in which Spinal Accessory Nerve was not sacrificed were given a tag of Group 1 and patients in which the nerve was sacrificed were given the tag of Group 2.

Percentage change in Group 2 was  $40.11 \pm 7.9$  in 1<sup>st</sup> week, after proper exercise and efforts, percentage change in the range of abduction was improved to  $(33.41 \pm 8.0)$ , but difference was found to be more as compared to Group 1 ( $14.21 \pm 6.1$ ) at regular follow up of 1<sup>st</sup> month. In Group 2, percentage change in degree of abduction was  $(21.1 \pm 5.9)$ , but difference was found to be more as compared to Group 2 ( $8.6 \pm 5.6$ ) at regular follow up of 3<sup>rd</sup> month after proper physiotherapy. In Group 2, abduction was improved with mean of  $(140.7 \pm 10.7)$  which was found to be lower than that of Group 1 ( $163.17 \pm 9.8$ ) at regular follow up of 3<sup>rd</sup> month. This difference in percentage change was found to be statistically significant (p value < 0.0001). On applying Greenhouse-Geisser test range of abduction was significantly reduced in Group 2 as compared to Group 1, in 1<sup>st</sup> week. This indicates that neck dissection has the greatest impact on shoulder abduction in cases where we preserve Spinal Accessory Nerve. The difference in impact can be explained by the fact that the Trapezius muscle is active during abduction.

The type and extent of dissection is dictated by the tumor site, size and stage. However, when possible, surgery should be as selective as possible to reduce shoulder pain and restriction in abduction. Additionally a modified neck dissection preserving the XI Nerve in a clinical positive node does not adversely affect survival; however any residual nodal tissue should not be left.

In our study, we substantially found out that the percentage change in abduction was less in patients in which Spinal Accessory Nerve was preserved during dissection, in comparison to patients where the said nerve was sacrificed.

The improvement in change in abduction, after 3 months of Physiotherapy, was improved more in patients where the nerve was preserved.

Similarly, change in flexion and internal rotation of shoulder joint was found to be better where Spinal Accessory nerve was preserved. In

cases where PMMC flap was not used, the above said attributes (flexion and internal rotation), were found to be better. While neck dissection, intra operative gentle traction over nerve should be given in order to prevent neuropraxia. In cases of MRND, entire course of nerve should be defined by fine dissection without damaging the vessels supplying the nerve.

SPADI score was also found to be better where Spinal Accessory nerve was preserved. SPADI score did not statistically vary whether PMMC flap was used or not. SPADI score was found to be improved with 3 months of Physiotherapy.

In our study we concluded, in patients undergoing Neck dissection, where Spinal Accessory Nerve was preserved, shoulder function was found to be better with lower morbidity and good SPADI score. Physiotherapy played a crucial role post operatively and patients should be motivated to adopt the same in future. However, Spinal accessory nerve should be sacrificed whenever nodal tissue is in the vicinity of the nerve and R0 dissection is not possible.

In our study shoulder function was measured by Goniometer. However, to predict nerve function, tests like Electromyography and nerve conduction test play an important role and further study should be done with the same.

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