



A COMPARATIVE STUDY ON OUTCOMES AFTER TOTAL THYROIDECTOMY AND SUBTOTAL THYROIDECTOMY IN MULTINODULAR GOITRE IN FEMALE PATIENTS

General Surgery

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ABSTRACT

Multinodular Goitres are the most common presentation of thyroid disorders in the department of general surgery. Total thyroidectomy and subtotal thyroidectomy as treatment options for benign multinodular Goitres was evaluated in this study with a total of 100 patients, 50 undergoing Total thyroidectomy as primary surgery and 50 patients undergoing Subtotal Thyroidectomy. The mean age of presentation of the patients in this study was 39.7 years, with majority of the patients falling in the age group of 30-40 years in both the groups. Euthyroidism was found to be the most common functional thyroid status with 86% cases in Total Thyroidectomy group and 96% cases in Subtotal Thyroidectomy group. Fine Needle Aspiration Cytology performed revealed Nodular Goitre to be the most common cytological finding in both the groups, followed by Colloid Nodular Goitre. Ultrasonography confirmed the presence of Multinodular Goitres in 98% cases in Total Thyroidectomy group and 100% cases in Subtotal Thyroidectomy group. In the immediate post-operative period, Hypocalcemia was the most common complication encountered in 9 cases of Total Thyroidectomy and 6 cases of Subtotal thyroidectomy, which was transient and controlled adequately by supplemental calcium. Recurrent laryngeal nerve injury and mild respiratory discomfort was found to occur in a small percentage in both the groups, statistically insignificant. Histopathological examination of the specimen revealed a startling 25 % cases of incidental thyroid cancer among the 100 operated - 9 cases in Total Thyroidectomy and 9 in Subtotal Thyroidectomy. The detection is probably due to processing focal points of malignancy by pathologists in the specimen that could have been missed while performing FNAC preoperatively. Also, availability of better microtomes and thinner sections of specimen aid the diagnosis. Papillary carcinoma-classical and Follicular variant were the most commonly diagnosed incidental thyroid malignancy in both the groups. The patients with incidental malignancy underwent completion surgery. Among the 9 patients with incidental cancer in the Subtotal thyroidectomy group, all underwent only completion thyroidectomy, increasing their risk of complications due to Re-surgery along with the duration of hospital stay. Among the 9 patients with incidental cancer in the Total Thyroidectomy group. The remaining 6 cases did not require any further adjuvant therapy, as Total thyroidectomy itself was curative, thereby proving beneficial in reducing morbidity. The post discharge surveillance of thyroid hormonal status and calcium status revealed equivocal results in both the groups wherein by the end of 180 days all patients were Euthyroid (with a fixed dosage of L-thyroxine) and Normocalcemic. No permanent implications of surgery were noted in both the groups. Recurrence as a complication needs to be assessed over a period of 20-30 years, which was beyond the scope of the present study. In view of the above, Total Thyroidectomy as the primary surgical treatment for multinodular Goitres is better than Subtotal thyroidectomy due to the prospects of better cure, increased detection of incidental thyroid malignancy, avoidance of Re-surgery, and its associated morbidity and equivocal complications observed in both the groups.

KEYWORDS

Total Thyroidectomy, Sub Total Thyroidectomy, Calcium, Carcinoma

INTRODUCTION

Among the endocrine disorders worldwide diseases of thyroid diseases are the most common, next only to diabetes, India is no exception. Recent statistics shows that 300 million people in world are suffering from thyroid disorders and amongst them about 42 million people reside in India¹.

Thyroid disorders are more common among women than in men. One in every eight women throughout their life time has risk for thyroid disorder. The exact reason is not known. The higher prevalence in females may be associated with estrogen and progesterone.¹

For patients undertaking thyroid surgery, there is a changing standard of care. A thyroidectomy, whether it is partial thyroidectomy or total thyroidectomy, is set in contrary to standards of outstanding outcomes, low risks and patient satisfaction. With the current revision of professional society practice guidelines and paradigms, the indications for thyroid surgery have become more modified and selective. With the rising incidence of thyroid malignancy and better detection of thyroid nodules, the number of patients needing thyroid surgery is increasing²

Total thyroidectomy has been accepted as current surgical treatment for benign and malignant thyroidal disorders^{3,4}, but extensive resection might increase the risk of post-operative complications⁵. Subtotal thyroidectomy in cases of benign Goitre carries a high risk of recurrence. The relatively high rate of postoperative incidental cancer findings also leads to secondary completion thyroidectomy frequently. Internationally therefore the paradigm has shifted from subtotal

thyroidectomy to extended or total thyroidectomy, which shifts the risk to the vocal cords and parathyroids, complications are much worse than those to the thyroid⁶

The important complications of thyroid surgery are RLN injury and hypoparathyroidism. The thyroidectomy complications rates have a varying range for both RLN injury (0-14%) and permanent hypoparathyroidism (1-11%)⁷. More effort should be spent to prevent these events, because they can be prevented with appropriate surgical technique during total thyroidectomy^{4,8}

Not much significant higher complications noted in extended thyroidectomy than subtotal thyroidectomy without identification of the nerve and parathyroids⁹⁻¹¹. The aim of this study was to review and assess the complications with outcomes following total versus subtotal thyroidectomy,

AIM AND OBJECTIVES

To compare the outcomes of total thyroidectomy and subtotal thyroidectomy in multinodular goitre in female patients.

Primary Aim

- 1.Prevalence of recurrent goitre in both sub-total and total thyroidectomy groups.
- 2.Incidental thyroid malignancy in both sub-total and total thyroidectomy groups..
- 3.Need for revision thyroid surgery in both sub-total and total thyroidectomy groups.

Secondary aim

1. Hypoparathyroidism in both sub-total and total thyroidectomy groups.
2. Injury to recurrent laryngeal nerve in both sub-total and total thyroidectomy groups.

MATERIALS AND METHODS

Type of Study: prospective study

Study Duration: One and half year from the scientific and Ethical committee approval.

Source Of Data: All the patients with clinical diagnosis of multinodular goitre admitted in the department of general surgery, SVRRGG hospital, Tirupati.

Sample size: 100

Inclusion Criteria:

1. Only patients with nontoxic multi nodular Goitre.
2. Female patients with in 30-50 years age group.

Exclusion Criteria

1. Thyroid malignancy or other form of thyroiditis like hashimoto's thyroiditis, De Quervian's thyroiditis, post-partum thyroiditis, drug induced thyroiditis, infectious thyroiditis.
2. Male patients and female patients > 50 years age.
3. Patients with thyrotoxicosis.
4. Patients who have undergone previous thyroid surgeries.
5. Patients associated with comorbidities.
6. Inability to comply with follow up protocol

Sample Method

1. Patients fulfilling the inclusion criteria are selected.
2. Written and informed consent is taken.
3. The cases are subjected to investigations.

Methodology

1. History taking
 2. Physical examination and indirect laryngoscopy
 3. Radiological investigations
 4. Blood investigations
 5. Fine needle aspiration cytology
 6. Surgical treatment
 7. Histo-pathological examination
 8. Appropriate treatment based on histopathology report
- Post-operative regular follow up of patients at 30 days, 60 days, and 180 days.

OBSERVATION AND RESULTS

The main aim of the present study is evaluating the outcomes after sub-total thyroidectomy and total thyroidectomy in female patients presented with multinodular Goitres, admitted in S.V.R.R.G.G.H hospital, from September 9th 2020 to September 8th 2021.

In the study total 100 diagnosed cases of multinodular Goitres were taken. In 100 cases 50 cases underwent sub-total thyroidectomy and remaining 50 cases underwent total thyroidectomy and were followed up for 180 days to evaluate post-operative thyroid hormone status, incidence of injury to recurrent laryngeal nerve, calcium levels and incidental thyroid malignancy.

A) Age Distribution:**Table 1: Age Distribution Of Patients**

			GROUP		TOTAL
			STT	TT	
AGE GROUP	30-40	Count	27	33	60
		%	54%	66%	60%
	41-50	Count	23	17	40
		%	46%	34%	40%
Total		Count	50	50	100
		%	100%	100%	100%

The present study is done in the females of age groups of 30-50 years where the incidence of MNG is high, with 27 cases in sub-total thyroidectomy group and 33 cases in total thyroidectomy group in the age group of 30-40 years. 23 cases in sub-total thyroidectomy group and 17 cases in total thyroidectomy group in the age group of 41-50

years. However this difference is not statistically significant as p value is not less than 0.05.

B) Pre Operative Thyroid Function:**Table 2: Pre Operative Thyroid Function Of Patients**

			GROUP		Total
			STT	TT	
TFT	EU	Count	48	43	91
		%	96%	86%	91%
	HYPER	Count	1	2	3
		%	2%	4%	3%
	HYPO	Count	1	5	6
		%	2%	10%	6%
Total	Count	50	50	100	
	%	100%	100%	100%	

In sub-total thyroidectomy group 96% were in euthyroid state, 2% in hyperthyroid state and 2% in hypothyroid state. In total thyroidectomy group 86% were in euthyroid state, 4% were in hyperthyroid state and 14% in hypothyroid state. This suggests that euthyroid state is the most common presentation in both groups.

C) FNAC:**Table 3: Pre Operative FNAC of patients**

			GROUP		Total
			STT	TT	
FNAC	AG	Count	2	7	9
		%	4%	14%	9%
	CG	Count	6	6	12
		%	12%	12%	12%
	CNG	Count	8	9	17
		%	16%	18%	17%
	FN	Count	1	1	2
		%	2%	2%	2%
	NG	Count	33	27	60
		%	66%	54%	60%
Total		Count	50	50	100
		%	100%	100%	100%

The above data suggests that most common cytological diagnosis in both groups is nodular Goitre with 54% in total thyroidectomy group and 66% in sub-total thyroidectomy group followed colloid nodular Goitre. 2% of cases in total thyroidectomy group have been diagnosed with follicular neoplasm.

D) Ultrasound Of Neck:**Table 4: Ultrasound Of Neck Of Patients**

			GROUP		Total
			STT	TT	
USG	HMT	Count	0	1	1
		%	0%	2%	1%
	MNG	Count	50	49	99
		%	100%	98%	99%
Total		Count	50	50	100
		%	100%	100%	100%

Out of 100 cases considered, the Ultrasound diagnosis confirmed presence of Multinodular Goitre in 99% of the cases while 1% of the cases were Hashimoto's Thyroiditis.

E) Post Operative IDL:**Table 5: Post Operative IDL of patients**

			GROUP		Total
			STT	TT	
POST OP IDL	L PALSY	Count	1	1	2
		%	2%	2%	2%
	R PALSY	Count	0	1	1
		%	0%	2%	1%
	WNL	Count	49	48	97
		%	98%	96%	97%
Total		Count	50	50	100
		%	100%	100%	100%

97% cases have with in normal limits (WNL) in subtotal thyroidectomy and total thyroidectomy patients when post-operative indirect laryngoscopy was done, very less percentage of cord palsy was noted.

F) Post Operative Thyroid Status:**Table 6: Post Operative Thyroid Status Of Patients**

			GROUP		Total
			STT	TT	
TS	NIL	Count	49	48	97
		%	98%	96%	97%
	PRESENT	Count	1	2	3
		%	2%	4%	3%
Total		Count	50	50	100
		%	100%	100%	100%

As per the study few percentage 2%, 4% noted in subtotal and total thyroidectomy cases respectively, which is not significant.

G) Post Operative Hypocalcemia:**Table 7: Post Operative Hypocalcemia of patients**

			GROUP		Total
			STT	TT	
HYPOCALCEMIA	ABSENT	Count	44	41	85
		%	88%	82%	85%
	PRESENT	Count	6	9	15
		%	12%	18%	15%
Total		Count	50	50	100
		%	100%	100%	100%

As per the data, No hypocalcemia in 88% of subtotal thyroidectomy and 82% of total thyroidectomy cases and present in 12%, 18% in subtotal and total thyroidectomy respectively.

H) Post Operative SSI:**Table 8: Post Operative SSI of patients**

			GROUP		Total
			STT	TT	
SSI	ABSENT	Count	49	49	98
		%	98%	98%	98%
	PRESENT	Count	1	1	2
		%	2%	2%	2%
Total		Count	50	50	100
		%	100%	100%	100%

98% cases have SSI in both total and subtotal thyroidectomy and there is no significant statistical difference.

I) Post Operative HPE:**Table 9: Post Operative HPE of patients**

			GROUP		Total
			STT	TT	
HPE	CG	Count	3	0	3
		%	6%	0%	3%
	CNG	Count	8	5	13
		%	16%	10%	13%
	DG	Count	0	4	4
		%	0%	8%	4%
	FA	Count	1	1	2
		%	2%	2%	2%
	HMT	Count	1	2	3
		%	2%	4%	3%
	M Ca	Count	1	1	2
		%	2%	2%	2%
	MpCa	Count	0	1	1
		%	0%	2%	1%
	MNG	Count	11	20	31
		%	22%	40%	31%
	NG	Count	17	9	26
		%	34%	18%	26%
	P Ca	Count	5	4	9
		%	10%	8%	9%
	P Ca – FV	Count	3	3	6
		%	6%	6%	6%
Total			Count	50	100
			%	100%	100%

After surgery specimen is sent for histo-pathological examination which revealed that nodular Goitre was most common in sub-total thyroidectomy group accounting for 34% of cases (17 in number), multinodular Goitre for 22% of cases (11 in number), colloid nodular

Goitre for 16% of cases (18 in number) colloid Goitre for 6% cases (3 in number), follicular adenoma and Hashimoto's thyroiditis cases (1 each). In the total thyroidectomy group, Colloid Nodular Goitre (5 cases), Multinodular Goitre (20 cases), Nodular Goitre (9 cases), diffuse Goitre (4 cases), Hashimoto's thyroiditis (2 cases) and Follicular Adenoma (1 case). Interestingly, a high incidence of incidental malignancy was noted, 18 cases out of 100 operated, equal incidence (9 cases) in TT group and STT group. Papillary carcinoma was recorded highest with 9 cases and followed by Follicular variant of Papillary carcinoma with 6 cases, 1 case with Micro-papillary carcinoma and 2 cases with Medullary carcinoma. In total, incidental thyroid malignancy constituted 18% of the total cases of Multinodular Goitres.

J) Re Surgery:**Table 10: Re Surgery for patients**

			GROUP		Total
			STT	TT	
Re Sx	NO	Count	41	48	89
		%	82%	96%	89%
	YES	Count	9	2	11
		%	18%	4%	11%
Total		Count	50	50	100
		%	100%	100%	100%

All those cases diagnosed as malignancy on histo-pathological examination were re-operated for completion surgery with or without dissection of neck nodes in STT group patients, and only 2 cases in TT patients for central neck dissection

K) Post Operative TFT @ 30 days:**Table 11: Post Operative TFT @ 30 days**

			GROUP		Total
			STT	TT	
TFT @ 30 DAYS	EU	Count	35	29	64
		%	70%	58%	64%
	HYPO	Count	15	21	36
		%	30%	42%	36%
Total		Count	50	50	100
		%	100%	100%	100%

The incidence of hypothyroidism is more in TT Group (42%) than STT group (30%). but most of the patients in both groups are euthyroid.

L) Post Operative CALCIUM @ 30 days:**Table 12: Post Operative CALCIUM @ 30 days**

			GROUP		Total
			STT	TT	
CALCIUM @ 30 DAYS	HYPO	Count	6	6	12
		%	12%	12%	12%
	NORMAL	Count	44	44	88
		%	88%	88%	88%
Total		Count	50	50	100
		%	100%	100%	100%

The incidence of hypocalcemia after 30 days is very less (12%), and these patients were also normalised at the end of the study @ 180 days.

M) Post Operative TFT @ 60 days:**Table 13: Post Operative TFT @ 60 days**

			GROUP		Total
			STT	TT	
TFT @ 60 DAYS	EU	Count	44	37	81
		%	88%	74%	81%
	HYPO	Count	6	13	19
		%	12%	26%	19%
Total		Count	50	50	50
		%	100%	100%	100%

The patients are gradually becoming euthyroid after 30 days of post discharge in both the STT and TT groups.

N) Post Operative TFT @ 180 days:**Table 14: Post Operative TFT @ 180 days**

			GROUP		Total
			STT	TT	
TFT @ 180 DAYS	EU	Count	50	50	100
		%	100%	100%	100%

Total	Count	50	50	100
	%	100%	100%	100%

All the patients had become euthyroid at the end of the study.

DISCUSSION

Most commonly presented thyroid disorder is multinodular Goitre, with surgical removal of gland being the main stay of treatment. The feasible options available are sub-total thyroidectomy and total thyroidectomy based on surgeon's preference.

The present study evaluated the complications associated with sub-total thyroidectomy and total thyroidectomy in the treatment of multinodular Goitre, which are diagnosed clinically and radiologically.

For the purpose of this study, a total of 100 patients presenting with MNGs were selected, out of which 50% were subjected to Total Thyroidectomy while the balance were subjected to Subtotal Thyroidectomy.

Age Incidence

Maximum incidence of thyroid disease was seen in age group of 30-50 years in the study with mean age of 39.7 years. In other studies done by salman yousuf guraya et al¹² similar results were seen with mean age of 39.1 years. Mean age of 48.7 years is seen in study conducted by Micheal vaiman et al¹³. Study conducted by emad naeem mohammed hokkam et al¹⁴ had maximum incidence in 43 to 45 years.

Pre-operative Thyroid Gland Functional Status

Most common presentation in present study was euthyroidism (86% cases in total thyroidectomy group and 96% cases in sub-total thyroidectomy group). Before commencement of surgery cases with hyper and hypothyroid state were optimised.

Preoperative FNAC

For all cases of benign thyroid disease in both groups FNAC test was done with results constituting nodular Goitre 54% in total thyroidectomy group and 66% in sub-total thyroidectomy group. The second common cytological presentation is colloid nodular Goitre. 2 cases were diagnosed as follicular neoplasm.

Ultrasonography

Ultrasound neck was used for confirmation of nature of thyroid disease which revealed multinodular Goitre as most common diagnosis. Radiologically lymph nodes were not seen in neck confirming the benign status of the gland.

Before surgery, all patients were examined with Indirect Laryngoscopy, had normal vocal cord mobility. A Neck X Ray was done to visualize the trachea and found to be within normal limits, showed neither any deviation nor compression.

Depending on the preference of the operating surgeon the patients were subjected to Total or Subtotal thyroidectomy. They were followed up judiciously during the period of stay at hospital and 180 days post discharge. Post-operative complications were noted in both the groups and analysed.

Post-operative complications

After surgery, the patients were observed for immediate complications as hypocalcemia due to injury or accidental removal of parathyroid gland and RLN injury leading to hoarseness of voice. The present study is compared with the studies conducted previously and has been tabulated. Also the later complications related to the wound as infection, seroma formation, were noted.

The post discharge surveillance of the patients was made for thyroid hormonal value and hypocalcemia for a period of 180 days, on 30th, 60th, and 180th day of post discharge period. The following results were seen:

Hypocalcemia was found to be almost equal incidence with 9 cases in total thyroidectomy group and 6 cases in subtotal thyroidectomy group. This was corrected as per the severity by giving either IV calcium or oral calcium supplementation, which did not have any permanent implications suggesting that this is a transient complication. Similar results were observed in the study by Guraya et al (2011) with 5 cases in Total thyroidectomy group and 4 cases in

Subtotal thyroidectomy group.

Injury to recurrent laryngeal nerve was seen in 2 cases in total thyroidectomy group and 1 case in subtotal thyroidectomy group. The immediate post-operative complication was hoarseness of voice which is recovered during the period of study suggesting that this is also a transient complication. These results are supported by the observations of Serdar Ozbas et al (2005)¹⁵ where 5 patients in total thyroidectomy group and 4 patients in sub-total thyroidectomy group, transient recurrent laryngeal nerve palsy was seen. The study by Hokkam et al (2011) also showed parallel results where 10.2% patients developed transient recurrent laryngeal nerve injury in Total thyroidectomy group and 10.5% patients developed recurrent laryngeal nerve injury in sub-total thyroidectomy group, also recovered well in the post-operative period.

The thyroid storm complication is also seen similar to recurrent laryngeal nerve palsy which is treated by anti- thyroid medications and complication is controlled.

Surgical site related complications were minor with equal incidence in both groups.

Statistically none of the complications were found to be significant, in the present study as well as studies by Guraya et al (2011), Ozbas et al (2005) and Hokkam et al (2007).

Incidental thyroid malignancy

The incidental thyroid malignancy was seen in 9 cases of total thyroidectomy group and 9 cases of sub-total thyroidectomy group which is 18% of total sample size requiring re-surgery in the present study. Most common incidental malignancy is papillary carcinoma followed by follicular carcinoma. Medullary carcinoma was seen in 1 patient in total thyroidectomy group who underwent central neck dissection. 6 patients in the total thyroidectomy group detected with incidental thyroid malignancy did not require any further surgery because of completeness of the preliminary procedure, whereas 9 patients in sub-total thyroidectomy group had underwent completion thyroidectomy with or without central neck dissection as re-surgical procedure which increased the morbidity significantly, along with the complication rate. The study conducted by guraya et al (2011) also revealed more permanent complications in cases of re-surgery. Study conducted by menegaux et al (1999) reported that in their study of 203 thyroid re-surgeries, permanent complications were found higher than in primary thyroid surgery.

These observations showed that total thyroidectomy as the primary surgical procedure for multinodular Goitre, which decreases the need of secondary procedure or re-surgery.

Post Discharge Surveillance

Post discharge follow up was done by looking at thyroid hormonal status and calcium levels, where it was found that supplemental L-thyroxine was required for all patients (individualised dosage) in first 30 days along with supplemental calcium. by the end of 180 days of surveillance all patients attained euthyroid state eventually with fixed dosage of L-thyroxine and normal calcium levels without any supplemental calcium. Both groups had not shown any permanent complications which suggested that no group had additional advantage over other.

Only limitation of the study is duration of the study where recurrence of thyroid cancer cannot be assessed. Many studies recommend a 30 year follow up though recurrences occur within 10 years of primary surgery.

CONCLUSION

Multinodular Goitres are the most common presentation of thyroid disorders in the department of general surgery. Total thyroidectomy and subtotal thyroidectomy as treatment options for benign multinodular Goitres was evaluated in this study with a total of 100 patients, 50 undergoing Total thyroidectomy as primary surgery and 50 patients undergoing Subtotal Thyroidectomy.

The mean age of presentation of the patients in this study was 39.7 years, with majority of the patients falling in the age group of 30-40 years in both the groups.

Euthyroidism was found be the most common functional thyroid status

with 86% cases in Total Thyroidectomy group and 96% cases in Subtotal Thyroidectomy group.

Fine Needle Aspiration Cytology performed revealed Nodular Goitre to be the most common cytological finding in both the groups, followed by Colloid Nodular Goitre.

Ultrasonography confirmed the presence of Multinodular Goitres in 98% cases in Total Thyroidectomy group and 100% cases in Subtotal Thyroidectomy group.

In the immediate post-operative period, Hypocalcemia was the most common complication encountered in 9 cases of Total Thyroidectomy and 6 cases of Subtotal thyroidectomy, which was transient and controlled adequately by supplemental calcium. Recurrent laryngeal nerve injury and mild respiratory discomfort was found to occur in a small percentage in both the groups, statistically insignificant.

Histo-pathological examination of the specimen revealed a startling 25 % cases of incidental thyroid cancer among the 100 operated - 9 cases in Total Thyroidectomy and 9 in Subtotal Thyroidectomy. The detection is probably due to processing focal points of malignancy by pathologists in the specimen that could have been missed while performing FNAC preoperatively. Also, availability of better microtomes and thinner sections of specimen aid the diagnosis.

Papillary carcinoma-classical and Follicular variant were the most commonly diagnosed incidental thyroid malignancy in both the groups.

The patients with incidental malignancy underwent completion surgery.

Among the 9 patients with incidental cancer in the Subtotal thyroidectomy group, all underwent only completion thyroidectomy, increasing their risk of complications due to Re-surgery along with the duration of hospital stay.

Among the 9 patients with incidental cancer in the Total Thyroidectomy group. The remaining 6 cases did not require any further adjuvant therapy, as Total thyroidectomy itself was curative, thereby proving beneficial in reducing morbidity.

The post discharge surveillance of thyroid hormonal status and calcium status revealed equivocal results in both the groups wherein by the end of 180 days all patients were Euthyroid (with a fixed dosage of L-thyroxine) and Normocalcemic. No permanent implications of surgery were noted in both the groups.

Recurrence as a complication needs to be assessed over a period of 20-30 years, which was beyond the scope of the present study.

In view of the above, Total Thyroidectomy as the primary surgical treatment for multinodular Goitres is better than Subtotal thyroidectomy due to the prospects of better cure, increased detection of incidental thyroid malignancy, avoidance of Re- surgery, and its associated morbidity and equivocal complications observed in both the groups.

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