ORIGINAL RESEARCH

Impact of up-gradation of a Rural Non-teaching District Hospital to Teaching Medical College Hospital on the quality and quantity of major elective surgical procedures in South Kashmir

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ABSTRACT
Introduction: Ministry of Health Government of India launched a scheme of up-gradation of Rural Non-teaching District Hospitals to teaching Medical Colleges in May 2016 to increase the infrastructure and manpower for the improvement of health care. Government Medical College Anantnag was one among the 72 new Medical Colleges started in the country from district hospitals. **Aims and Objectives**: The aim of this study was to assess the impact on the quality and quantity of major elective surgeries by the up-gradation of the district hospital to a teaching Medical College. **Methods:** The record of all major elective surgeries from April 2018 to March 2019 (District Hospital Period) and April 2019 to March 2020 (Medical College Period) was retrieved respectively and analysed to see any significant improvement in the quality and quantity of the surgical procedures. **Conclusions**: The results showed a significant increase in the number of surgeries as well as the performance of high quality advanced surgeries not done before the establishment of Medical College.
Key words: Rural District Hospital, Major Elective, Up-gradation

INTRODUCTION

To improve the health sector in the peripheries, Government of India upgraded various Non-teaching Rural District Hospitals of the country into Medical Colleges with an aim of improving quality of healthcare and produce more doctors to improve Doctor Patient ratio in the population. As a part of this up gradation, District Hospital Anantnag in Southern part of the Kashmir Division was upgraded to an Associated Hospital of Government Medical College conceived in 2015 and started in 2019. The existing Hospital was reinforced with new faculty, Resident and paramedical staff. This study was undertaken to see the impact of up gradation of District Hospital Anantnag to a Medical college Hospital on the surgical profile of patients and their quality of management.

MATERIAL AND METHODS

This was a comparative study undertaken from April 2018 to March 2019 and April 2019 to March 2020. Records of patients electively operated from April 2018 up to March 2020 was collected, reviewed and analysed. Statistical analysis was performed using SPSS version 26.0.Appropriate statistical tests were performed for the comparison between the two proportions. The patients were divided into two groups. Group I from April 2018 to March 2019 including the data of elective surgeries performed in the non-teaching era of the hospital and group II from

April 2019 to March 2020 included the elective surgeries performed after the establishment of Medical College. Hence Group I was labelled Pre-Medical College and Group II Post-Medical college group.

PATIENT RECORDS WERE REVIEWED FOR

- Demographic details
- Signs and symptoms
- Workup and diagnosis
- Operative details
- Postoperative complications
- Hospital stay

The type of surgery and total number of cases were compared between the two groups.

RESULTS

Total of 2058 patients were operated from April 2018 to March 2020. Out of these 866 patients were operated from April 2018 to March 2019 while 1189 patients were operated from April 2019 to March 2020 (table 1). The various surgical procedures undertaken in the two groups are depicted in table 2. As can be inferred from the data more number of patients were operated in group II than group I. Besides few procedures were done first time like advanced laparoscopic procedures and GI cancers. Procedures like TEP(Totally Extra-peritoneal Mesh Hernioplasty),TAPP(Trans-Abdominal Pre-peritoneal Mesh Hernioplasty), IPOM(Intra-peritoneal Onlay Mesh Hernioplasty), laparoscopic Hydatid Cystectomy, MIPH(Minimally Invasive Procedure for haemorrhoids), Gastrectomy, Hemicolectomy, Frey's procedure and AV fistula for haemodialysis were done for the first time after the up gradation (table 3). There was a significant difference in the number of operated cases between the two groups in surgeries. When comparison was made specific to the surgery type no significantly different results were observed except in URSL with difference percentage 0.72 % (95%) CI: 0.160%, 1.584%; p-value=0.0086) and Gastrectomies with difference percentage 0.89 %(95% CI: 0.199%, 1.643%; p-value=0.012)

Table 1: Patient characteristics

Characteristic	Patients Operated During 1 calendar year		Percent Increase
	District Hospital Apr 2018 to Mar 2019	GMCHospital Apr 2019 to Mar 2020	
Male	399	540	26.11%
Female	467	652	28.37%
Total	866	1192	27.34%

Fig 1: Change in the number of Surgeries performed before and after transformation of District Hospital to GMC Hospital.

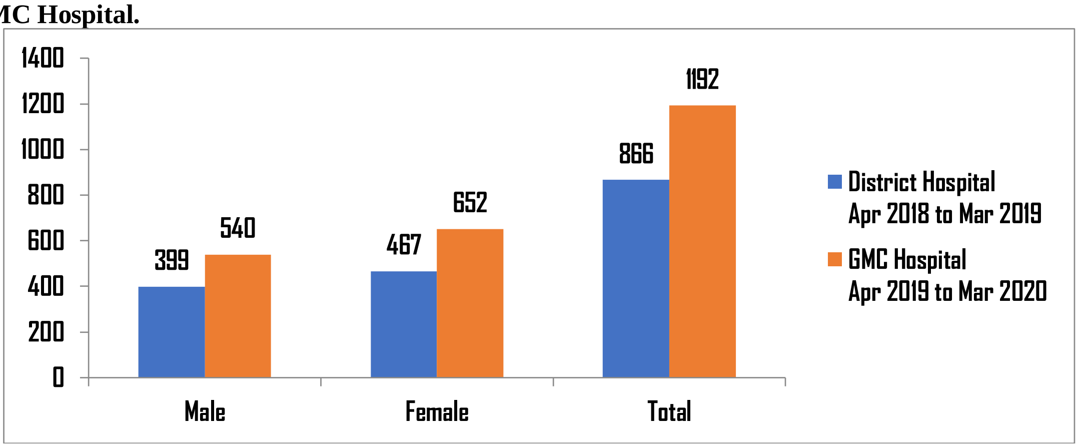

Table 2: Type of Surgeries performed before and after transformation of District Hospital to GMC Hospital.

Surgery	Patients Operated During 1 calendar year		Change Percentage	Difference (%)	95% CI	P-Value
	District Hospital Apr 2018 to Mar 2019 n=(%)	GMC Hospital Apr 2019 to Mar 2020 n=(%)				
Open Cholecystectomy	171 =(19.75)	196 =(16.48)	12.76	3.26	-0.082 to 6.697	0.056

Laparoscopic Cholecystectomy	347 =(40.07)	480 =(40.37)	27.71	0.30	-3.998 to 4.572	0.891
Inguinal Hernioplasty	60 =(6.93)	74 =(6.22)	18.92	0.70	-1.430 to 2.967	0.519
Haemorrhoidectomy	86 =(9.93)	97 =(8.16)	11.34	1.77	-0.715 to 4.368	0.164
Surgeries for anal fissure(LIS)	19 =(2.19)	33 =(2.78)	42.42	0.59	-0.853 to 1.938	0.400
Orchidopexy	11 =(1.27)	19 =(1.6)	42.11	0.33	-0.814 to 1.377	0.532
Open hydatid cystectomy	5 =(0.58)	6 =(0.5)	16.67	0.08	-0.597 to 0.895	0.806
Lap hydatid cystectomy	0 =(0)	6 =(0.5)	600.00			
Open incisional hernia	5 =(0.58)	10 =(0.84)	50.00	0.26	-0.598 to 1.034	0.494
IPOM	0 =(0)	2 =(0.17)	100.00			
Epigastric hernia	8 =(0.92)	15 =(1.26)	46.67	0.34	-0.676 to 1.268	0.469
Umbilical hernia	4 =(0.46)	14 =(1.18)	71.43	0.72	-0.142 to 1.556	0.084
Trendelenberg's for varicose veins	21 =(2.42)	31 =(2.61)	32.26	0.18	-1.278 to 1.546	0.786
Rectal polyp excision	5 =(0.58)	11 =(0.93)	54.55	0.35	-0.520 to 1.147	0.374
Hydrocele repair	16 =(1.85)	30 =(2.52)	46.67	0.67	-0.689 to 1.940	0.310
Pyelolithotomy	33 =(3.81)	36 =(3.03)	8.33	0.78	-0.790 to 2.489	0.332
Lap appendectomy	4 =(0.46)	3 =(0.25)	-33.33	0.21	-0.3513 to 0.948	0.418
Pilonidal sinus surgeries	5 =(0.58)	9 =(0.76)	44.44	0.18	-0.668 to 0.9332	0.625
Adnexial cyst excision	0 =(0)	10 =(0.84)	100.00			
Fistula inAno surgeries	5 =(0.58)	8 =(0.67)	37.50	0.10	-0.746 to 0.818	0.799
URSL	7 =(0.81)	1 =(0.08)	-600.00	0.72	0.160 to 1.584	0.0086
MIPH	0 =(0)	2 =(0.17)	100.00			
Gastro-jejunostomy	0 =(0)	5 =(0.42)	100.00			
Gastrectomies	1 =(0.12)	12 =(1.01)	91.67	0.89	0.199 to 1.643	0.012
Hemicolectomy	0 =(0)	3 =(0.25)	100.00			
CBD Explorations	0 =(0)	3 =(0.25)	100.00			
Surgeries for rectal prolapse	0 =(0)	1 =(0.08)	100.00			
Mastectomy for ca breast	0 =(0)	4 =(0.34)	100.00			
AV fistula for dialysis	0 =(0)	7 =(0.59)	100.00			
TEPP/TAPP	0 =(0)	7 =(0.59)	100.00			
Frey's for CCP	0 =(0)	1 =(0.08)	100.00			
TURP	17 =(1.96)	23 =(1.93)	26.09	0.03	-1.170 to 1.353	0.961
TURBT	5 =(0.58)	3 =(0.25)	-66.67	0.33	-0.258 to 1.116	0.236
Nephrectomy	6 =(0.69)	2 =(0.17)	-200.00	0.52	-0.605 to 1.339	0.061
Pyeloplasty	0 =(0)	1 =(0.08)	100.00			
Lap varicocelectomy	0 =(0)	2 =(0.17)	100.00			
Colostomy revision	0 =(0)	1 =(0.08)	100.00			
Hartmann's reversal	0 =(0)	1 =(0.08)	100.00			
Herniotomy in children	25 =(2.89)	20 =(1.68)	-25.00	1.20	-0.081 to 2.675	0.064
Total	**866**	**1189**	**27.34%**			

Surgeries which are shown as "0" in District Hospital were not performed during that study period

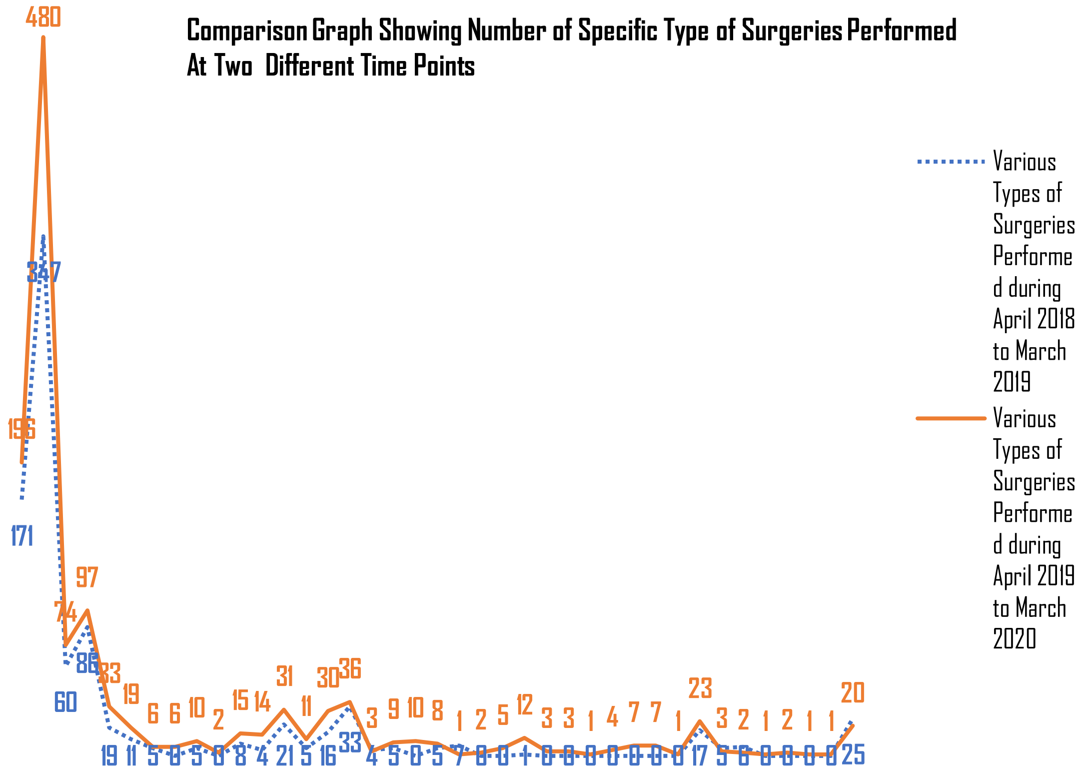

Table 3: Surgeries done for the first time in the GMC Hospital

Surgery	Number
Lap Hydatid Cystectomy	6
IPOM	2
TEPP/TAPP	7
Lap varicocelectomy	1
MIPH	2
Frey's procedure	1
Total/Subtotal /Partial Gastrectomy	12
Hemi-colectomies	3
Gastro-jejunostomy	5
CBD exploration	3
Modified Radical Mastectomy	4
AV Fistula	7
Colostomy revision	1
Hartmann's reversal	1

DISCUSSION

The Ministry of Health Government of India proposed the guidelines for establishment of new Medical Colleges in various states of the country to increase the number of doctors to match with the doctor patient ratio in the European countries as the same was dismal till 2015. The Ministry proposed to upgrade 72 Non-teaching hospitals with Bed strength of more than 200 in the districts without a Government Medical College to be upgraded as New Medical College teaching hospitals in May, 2015 (1). The Jammu and Kashmir union Territory was allocated 5 new Medical Colleges and one among them was Government Medical College Anantnag which started functioning in March 2019 with an intake of 100 undergraduate students. The erstwhile District Hospital Anantnag was designated as Associated Hospital of the Medical College with induction of mandatory skeletal staff of Faculty, residents and Paramedics. The clinical Departments were re-organized and the Department of Surgery came in the existence. The department was divided into 3 surgical units with one Professor and two Associate Professors as Unit heads. Each unit was having one Assistant

Professor, one Consultant 2 to 3 Senior Residents and few Junior Residents. The erstwhile surgical staff was included in these units.
The patient inflow saw a marked increase in the very first year and the number of elective surgeries increased rapidly. The patient care showed marked improvement as the teaching, accountability of residents and supervision and guidance of faculty staff that was lacking in non-teaching set up before.
Globally the academic health centers and their teaching programs are under duress as they struggle to cope with new and formidable fiscal challenges to their mission of patient care ,research and teaching(2-7).Studies conducted in nonfederal healthcare institutions in United States suggest that patient outcomes in large urban teaching hospitals are better than patient outcomes in smaller community and non-teaching hospitals(8-11) although the cost of care is higher and the length of stay is longer in the large teaching hospitals. In our observations the quantity of elective surgeries increased during the first year of establishment of teaching hospital only. Furthermore we could observe that more challenging and advanced surgeries were performed that might have been referred in the Pre- Medical College era. This could be attributed to engagement of experienced faculty and addition of resident staff and little increase in infrastructure like establishment of Surgical Intensive care and post-operative ward. Although it was observed that the cost of healthcare is higher (4, 12-17) and hospital stay is longer (18) in urban teaching hospitals that could not be substantiated in our observations. Probably due to huge rush of patients and limited bed strength we were forced to discharge operated patients earlier and the free healthcare schemes like PMJAY (Golden Card) by the Government could not prove a financial burden for the patients. Considering the bias of performing more advanced and complex surgeries in post Medical College Group we could not find significant difference in surgical outcomes between two groups. With the exception of a recent study using the Healthcare Financing Administration data base of Medicare discharges between 1984-1993 for ten medical diagnoses and ten surgical operations (18), the studies that address the association between teaching and non-teaching hospitals on surgical outcomes has been limited to small series revolving around isolated surgical procedures (19-21).
The Veterans Health Association (VA) the largest single provider of Healthcare Delivery System in United States plays a major role in training of Medical Students, Residents and Fellows. The debate about the future of training programs in hospitals is also becoming germane to the VA as it struggles to reorganize itself into more cost-efficient healthcare delivery system (22). In the study in VA Medical Centers with surgical training programs, the quality of surgical healthcare in teaching and non-teaching hospitals was compared using data from the VA National Surgical Quality Improvement Program (NSQIP) (23).
NSQIP collected database from 128 VA surgical centers and analyzed all the elements (24),The NSQIP database for three consecutive fiscal years(FY 1997-1999) was used for this study, The outcomes measured were 30 day post-operative mortality (25),the 30 day post-operative morbidity (defined as one or more complications (26), and post-operative length of hospital stay. This study used hierarchical logistic regression model (28-30) with mortality (or morbidity) as the dependent variable and only one patient level independent variable (severity index). Other terms in the model included the intercept indicating the inter-hospital differences in mortality rate, affiliation status (teaching vs. non-teaching hospital) and an interaction term of affiliation by severity. Mean length of stay for individual operations between teaching and non-teaching hospitals were tested using the Wilcoxon rank-sum test. All results were considered statistically significant at p value <0.05.
VA has made a major commitment to the training of healthcare providers including thousands of residents rotated annually. (31).
The initiative of the Government of India to develop more medical Colleges and teaching institutions carved out of erstwhile Rural District Hospitals catering to a vast population is definitely going to be a game changer for improvement of quality healthcare and replenishment of insufficient pool of doctors and paramedics. We could see in our study the encouraging results supported by the statistical calculations. The academic and research activities in these teaching institutions will bear the fruits of better quality healthcare of the population in future.

CONCLUSION
The up-gradation of the District Hospital to a teaching medical college has shown a marked improvement in the quality and quantity of major surgical procedures with the induction of senior faculty, residents and other manpower. This has resulted in the accountability, teaching and evidence based management of surgical patients as well as improvement in the quality and quantity of surgical procedures.

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