Changing Trend in COVID 19 Pandemic, Orthopaedic Care, and Arthroplasty - A Prospective Study Conducted in Indira Gandhi Institute of Medical Sciences, an Apex Tertiary Centre of Bihar

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ABSTRACT

BACKGROUND

The novel corona virus pandemic has a profound impact on health services throughout the world, which reflected the changing guidelines of different health societies in different time zones. We tried first to ensure the safety of our patients and surgical staff. Patient care priorities based on strict evidence-based management of a particular case and also COVID-19-adjusted government-imposed restriction during the crisis. We aim to study postoperative complication after arthroplasty and readmission rate and compared the same with the pre-pandemic era. We also address our strategies, concerns, and regulatory barriers due to government-imposed lockdown, during initial surge of pandemic and also when restrictions were lifted. This study is unique in the way that there is no such study from Bihar, a state of developing country with scarcity of specialized health services.

METHODS

In this prospective study done in Indira Gandhi Institute Of Medical Sciences, Patna, Bihar between 1st December 2019 to 31st January 2021 (14 months duration). We have selected a subset of those patient who were admitted for primary arthroplasty of hip during the pandemic after lock down, and compared those with patient those underwent similar operative management before the lockdown period.

RESULTS

There was no significant difference in postoperative complication and readmission rate when compared with the pre-pandemic era.

CONCLUSIONS

There is no significant increase in risks of patient as well as operating surgeon before the pandemic and during the pandemic when the elective operative procedure (arthroplasty) was allowed. Communication, precautions, and proper preoperative planning remain essential part of management at each step of treatment. By following above mentioned standard operative procedure (SOP) chances of getting infection of COVID-19 is negligible from operative work.

KEYWORDS

COVID 19, SARS-CoV-2, Arthroplasty, Orthopaedics

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DOI: 10.18410/jebmh/2021/470

How to Cite This Article:
Bhadani JS, Ahmed W, Kashyap N, et al. Changing trend in COVID 19 pandemic, orthopaedic care and arthroplasty - a prospective study conducted in Indira Gandhi Institute of Medical Sciences, An apex tertiary centre of Bihar. J Evid Based Med Healthc 2021;8(28):2544-2550. DOI: 10.18410/jebmh/2021/470

Submission 10-04-2021,
Peer Review 19-04-2021,
Acceptance 24-05-2021,
Published 12-07-2021.

BACKGROUND

The ongoing COVID-19 pandemic caused by the coronavirus (SARS-CoV-2), has huge threat to healthcare system worldwide. Orthopaedic care is not an exception. Evaluation of the pandemic, resources and manpower in planning were crucial to continue best possible health services for the society.[1]

During the crisis the orthopaedic emergency surgery is continuing at the risk of health of healthcare professionals. From mid-March 2020, surgeons have been instructed to only perform essential surgical procedures.[2] The world is still waiting for return to normal elective surgery including arthroplasty, as normal as pre-pandemic era. The indications of arthroplasty into "elective" versus "urgent" categories.

Included in decision-making algorithm for determining surgical urgency in recent literature.[3] It is indeed difficult to ascertain the true number of cases due to changing trend of availability of screening and diagnostics tests and varying presenting clinical illness. Although there was negative impact on economic growth.[4,5] Cases suddenly increased after government allowed intercity travel. Quantification of asymptomatic group is still difficult even after availability of widespread testing because as people considering COVID as social stigma. There was negligence and under reporting due to fear of quarantine.

For the elective orthopedic surgeries, we had a choice between continuing as same as before with proposed precaution according to changing guidelines or opting for conservative modalities of treatment for few months to delay the proposed procedure. Elective Operative cases, arthroplasty, arthroscopy was postponed initially in our institute.

The manpower of all the departments including orthopedics was participated in controlling the impact of a pandemic by providing services assisting outside their specialty.[6]

As one of the apex institutes of state we resumed the elective surgery after the lockdown period, as two major government hospitals in the capital of our state become COVID-19centre, and sufferers who really need arthroplasty had very few choices.

Aims and Objectives

The aim of this study is to determine the line of management by learning from our current experiences, mistakes, and achievements in patients who underwent primary total hip arthroplasty (THR) in the pre-Covid era and after the first surge of the pandemic. We also aim to determine a method of Orthopedic care of patients during the future surge of the current pandemic or similar pandemic in our state and the developing world.

The objectives are to ensure the safety of hospital staff and orthopaedic care of patients in emergency, inpatient, outpatient and operating theaters by creating and reevaluating protocols from time to time (based on government-imposed restrictions and health authority pandemic guidelines) in view of the ongoing pandemic.

METHODS

We have conducted a prospective cross-sectional study on patients admitted for primary THR at Indira Gandhi Institute of Medical Sciences, Patna, among patients admitted during different timeframes.

A subgroup of patients admitted for primary THR during the epidemic after lockdown was selected and compared with patients who had undergone similar operational management prior to the lockdown period.

Although we started the study after December 2019, which roughly coincided with starting of COVID 19 cases in other part of world, our hospital administration continued conducting elective surgeries till the end of February 2020 as done in most of other hospitals. The hospital had stopped electives surgery across all department including Orthopaedics roughly around the lockdown period.

Group	Group I: Pre Lockdown Period in Our Study	Group II: Post Lockdown Period in Our Study
Period of study	December 2019-february 2020	September 2020-January 2021
Number of cases	16 cases of hip arthroplasty	24 cases of hip arthroplasty
Number of readmission due to any complication	One readmission due to infection	One readmission due to infection

Table 1. Division and Comparison between the Two Groups

Follow-up of most of the patient were not possible physically especially during lockdown period. Thus, we allow telemedicine or WhatsApp video calling for assessment after 2 weeks, six weeks and three months period. Thus, we allow patient to undergo Xray examination and blood investigations (especially ESR and CRP), just few days before the telemedicine appointment.

Hospitalization details due to infections, post-operative complications. We also include changes in physiotherapy regimen due to imposed lockdown, as if elective cases were affected means of providing physiotherapy also had changed. We have included the protocol followed by the hospital administration, pre- and post-operative protocols to add new dimension of our knowledge.

We also studied postoperative complication after hip arthroplasty and readmission rate and compared the same with the pre-pandemic era. We also address our strategies, concerns, and regulatory barriers due to government-imposed lockdown, during initial surge of pandemic and also when restrictions were lifted. This article also aims to explain a brief outline about how we tried to kept ourselves safe (and affected little) without compromising the healthcare of society in the Orthopaedic department by changing our approach to provide our services during ongoing pandemics. We also studied how we resumed almost normal clinical and surgical services slowly available to mankind when restrictions were lifted. This study is unique in the way that there is no such study from Bihar, a state of developing country with scarcity of specialized health services.

Services Provided during Ongoing Pandemic

Initially most of the consultation was on telephonic conversation except the emergency services which were

running as usual with proper precautions. Our team members were working as frontline workers on rotation in emergency to tackle emergency trauma cases. We were opting for conservative means of management wherever possible as a definitive method of treatment or to delay operative management during initial surge. In those cases where urgent surgery was needed, we had done that by following proper precautions in operation theatre.

Protocol Followed in OPD

Appropriate precautions at all times including use of N95 masks.

Figure 1. Improperly Managed Queue of Patients: Situation Out of Control at Times, The Crowd on Admission Counter, after Repeated Announcement about Appropriate Precautions and Social Distancing

We Have Taken the Following Precautions and Prophylaxis

1. By hospital administration
   - We were preparing for the crisis when the pandemic was knocking on our door, by the end of December had several meetings to work on our preparedness.
   - Although we tried our best to update the knowledge thoroughly scrutinize the different changing guidelines of different authorities and followed what actually best fits for specific timeline keeping in mind the routine and emergency services of healthcare system (other than the pandemics) of our society.
   - To make a COVID-19 ward for own health care workers and their families,
   - Supplying good quality sanitizer, PPE kit, N95 masks, face shield, gloves, disposable gowns etc.
   - We also have started integrated telemedicine virtual consultation in addition to OPD visits to minimize the unnecessary crowding.
   - Elective Operative cases, arthroplasty, arthroscopy was postponed initially in our institute like most of the hospitals around the country, however we continue to contribute through face-to-face consultation addressing time sensitive urgent and emergent cases. We resumed the elective surgery after the lockdown period.
2. By personal level: hydroxychloroquine, Ivermectin vitamin C, Zinc, Vitamin D3 as a prophylaxis.

Admission and In-Patient Protocol Preoperative Preparedness Protocol

- If patient was found positive for COVID-19 infection during admission or the hospital course then shifted to other COVID-19 specialized centre in state.
- Ensure preoperative planning to cut short operative time.

Intraoperative Protocol

- Keeping in mind that the operating room is a high-risk environment during the pandemic, and more so during aerosol generating procedure like intubation and general anesthesia. All team members should don taking appropriate precaution according includes, face shield, water impermeable gown, gloves, eye protection, and an N95 mask with level 1 approved surgical mask.
- To prevent potential exposure, the surgical team use to enter the operative theatre only after the airway is secured.
- Keeping surgical team in small group
- Minimum trafficking in operation theatre.

Figure 2. Appropriate Precaution in Operation Theatre

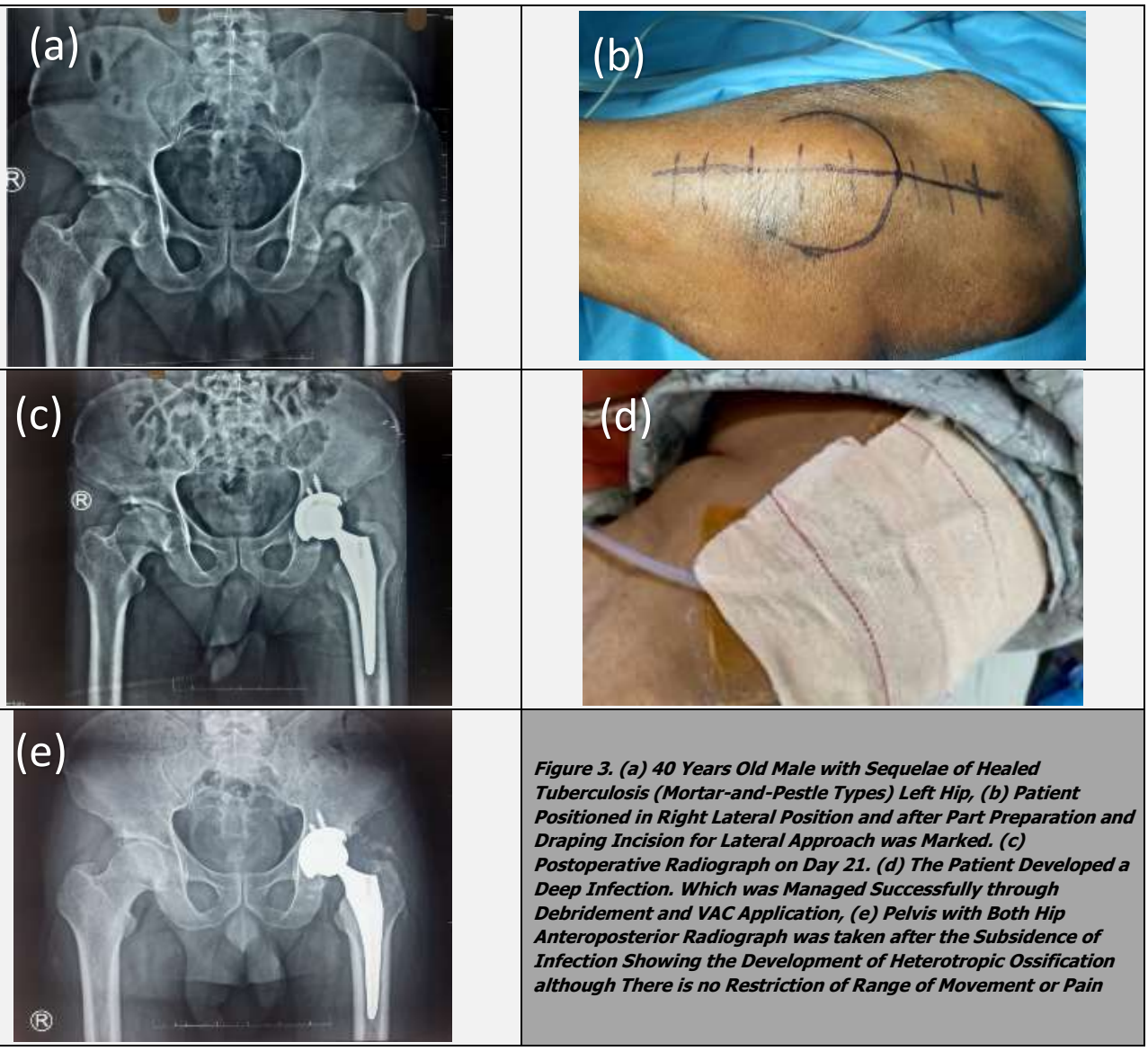

Figure 3. (a) 40 Years Old Male with Sequelae of Healed Tuberculosis (Mortar-and-Pestle Types) Left Hip, (b) Patient Positioned in Right Lateral Position and after Part Preparation and Draping Incision for Lateral Approach was Marked. (c) Postoperative Radiograph on Day 21. (d) The Patient Developed a Deep Infection. Which was Managed Successfully through Debridement and VAC Application, (e) Pelvis with Both Hip Anteroposterior Radiograph was taken after the Subsidence of Infection Showing the Development of Heterotropic Ossification although There is no Restriction of Range of Movement or Pain

Postoperative and Follow Up Protocol

- We limit visitors at office encounters and around the perioperative period. Taking appropriate precaution during dressings on day two and five.

In case of postoperative dyspnoea, or fever isolation of patient and repeat RTPCR for COVID-19.

Starting assisted ambulation and gait training on day two after the first dressing and postoperative check x ray evaluation.

- No undue delay in discharge. Usual discharge after second dressing on day five.
- Follow up in ortho OPD after one week of discharge for suture removal, assessment and physiotherapy (gait training and muscle strengthening, range of motion exercises).

Statistical Analysis

In this observational study we have compared the cases total hip arthroplasty before and after government-imposed lockdown due to COVID 19. We have compared the cases in terms of four variables mean age, gender wise proportion, side of total hip replacement and cemented versus uncemented immediate postoperative complications.

RESULTS

Group	Group I: Pre Lockdown Period in Our Study (December 2019 - February 2020)	Group II: Post Lockdown Period in Our Study (September 2020 - January 2021)
Period of study	3 months	5 months
Total number of cases	16	24
Mean age	45.4 years	49.2 years
M:F ratio	13 : 03	19 : 05
Right: Left (Side of Hip replacement)	07 : 09	14 : 10
Cemented vs Cementless THR	03 : 13	04 : 20
Immediate postoperative complications: Infection	1	1

Table 2. Statistical Analysis

We have studied 40 cases of total hip arthroplasty over 8 months period. Which is divided into two groups. Group one consists of 16 cases of THR done during pre-lockdown period, that is done between December 2019 to February 2020. Group two consists of 24 cases of THR done during post lockdown period, that is done between September 2020 to January 2021.There is no logical difference between two groups other than the time period. There is one complication as infection in each group. By using chi square test revealing

P value more than 0.05 there is no significant difference in immediate postoperative complication between pre-lockdown and post lockdown group.

Group	Group I: Pre Lockdown Period in Our Study (16 Cases)	Group II: Post Lockdown Period in Our Study (24 Cases)
Number of readmissions	One readmission due to infection	One readmission due to infection
Reason of readmission/ complication	Signs of infection without any discharge on Postoperative day 20	Signs of infection with serous discharge on Postoperative day 27(noticed during first follow up
Duration of second hospitalization	14 days	12 days
Mode of management	Conservative	Wound debridement followed by Vacuum assisted closure

Table 3. Readmission, Complications and Mode of Management

There is one superficial infection in group I and one in group II. Patient of group I presented with signs of infection after 20 days of operation suggested by local rise of temperature and erythema around suture site, increased ESR and CRP titre. He was managed successfully with readmission in hospital and injectable broad-spectrum antibiotic for two weeks. Patient had been discharged from hospital with oral antibiotic for another four weeks. Patient of group II presented with similar signs of infection but also had serous discharge from surgical scar site. We have noticed it when patient came for first follow up on postoperative day 27. We decided for readmission. Patient managed successfully with debridement, partial closure of wound and Vacuum assisted closure (VAC) (fig 3). During a period of 12 days of hospitalization, patient was on broad spectrum injectable antibiotic, as culture of the discharge had no growth. VAC removal was done on day four, and secondary closure was done and on 13th day after debridement patient was discharged after suture removal with oral antibiotic. We have given oral antibiotic levofloxacin 750 mg daily for four weeks. In both of the cases, third generation cephalosporin: ceftriaxone one gram twice daily through intravenous route during hospitalization. Apart from surgery related complications, none of our patients in either of two groups reported COVID 19 symptoms in follow-up period.

Physiotherapy: There is slight difference in postoperative regimen in group two as, physiotherapist used to help in strengthening muscle exercise and range of motion exercise and ambulation with walking frame with the intension to teach that patient with the help of attendant should do it without any difficulty. This was not done so carefully in group one patient: we also include changes in physiotherapy regimen due to imposed lockdown.

Postoperative patient reported outcome measures were used to evaluate any difference in short term functional outcome shown no significant difference. We have included the protocol followed by the hospital administration, pre- and post-operative protocols to add new dimension of our knowledge to help deciding the line of treatment by learning from our current experience, mistakes and achievements for the future surge of the current pandemic or similar pandemic. During the lockdown we have used social platform YouTube, WhatsApp for short video link of physiotherapy to learn and demonstration on video calling.

Limitation of this Study

In is a short-term study with limited number of cases. There are many potential variables which can cause bias in the result of study. E.g., different age group of patients (45.4 years is the mean age in group one while 49.2 years in group 2, postoperative regimen is not uniform due to unavoidable circumstances during lockdown in group one patient).

DISCUSSION

In our study we have observed predominantly male population those underwent total hip arthroplasty. Predominately younger population underwent surgery mainly because of osteonecrosis of femoral head. Thus, more and more uncemented arthroplasty were done to preserve the bone stock to deal with future need of revision arthroplasty. We do not operate on COVID-19 patients considering the our hospital administration guidelines and the poor consequences viz, half of those need ICU care and reported mortality rate in literature up to 20 %.[7] The good thing for Orthopaedic surgeon is that using high speed instruments like saw, drill, bur etc. has not been proven too risky as there was no isolation or spread of coronavirus from bone marrow.[8,9] While considering the appropriate precautions in outpatient, emergency or operation theatre, the importance of face mask is well proven and it is worth to mention that, orthopaedic surgical hoods alone are not at all recommended.[9,10]

Elderly, obese and patients with any other comorbidities considered to have at high risk for complications, mortality and morbidity.[11,12,13,14,15] 4 - 7 % mortality rate due to COVID 19 reported in this group, which is as high as, four times of the influenza virus.[11,13] In our study, we found six medical personnel COVID 19 positives in the orthopaedics department during the pandemic in different time periods. Out of six-person one required hospitalization and the rest recovered with home quarantine and supportive treatment. We followed the CDC recommendation for return of work after COVID-19. These recommendations are getting updated frequently. Recommendations includes the following: No fever without antipyretic use, no breathlessness at rest, and two negative COVID-19 tests on two consecutive days 24 hours apart. Although we found none of the infections had a direct relation with operative work but may have from outpatient, inpatient, and emergency patient care. All of the people had an infection during the initial surge of COVID-19, during that time only emergency surgery was allowed after ruling out COVID-19 in the patients.

Wilson et al[16] done a survey on 111 patient who underwent arthroplasty to study psychological implications due to delay in arthroplasty.90 % of patient reported surgical delay and 68 % reported emotional distress due to delay. Brown et al[17] in his study which was done in 15 institutions over a large sample of patient reported that most of the patient was anxious due to delay and 7 % of them reported delay due to fear of contracting COVID-19 in the hospital. In our study also most of the patient reported

anxiety although there were no major psychological implications.

Although retrospectively there were few lacunae in our systems which was learned with time:

1. All patients were not screened before entering the OPD for fever, chills, breathlessness, myalgia, or cough.
2. We were not issuing a mask for those patients who were not having it before entering the OPD, although most of the time we advised them to keep personal safety.
3. We have no control over those patients who suddenly remove the mask before explaining their complaints although we usually instruct them to put the mask back into place.
4. We repeatedly explain to the patient that the face mask should place over both mouth as well as nose, although it was hardly seen in people other than health care workers.
5. Social distancing of six feet was hardly possible among patients, although we tried to maintain it by keeping ourselves on another side of the table and making a patient face on the other side while examining.
6. Rearranging seats in waiting area to maintain social distance, limiting patient number, time slots coordination is hardly possible in a government hospital, although hospital administration succeeded by increasing the number of registration counter to maintain social distancing, keeping the hospital comparatively clean, and sanitizing it on regular basis.
7. Proper PPE-kit removal and disposal to be done in a specified area to prevent contamination.
8. Strict hand hygiene and social distancing always remained important aspects. Washing hands with soap and water was not always possible, so we kept sanitizer available the OPD table to wash, gloved hands before examining every patient.
9. We screened all patients for COVID-19 before admission and surgery, but it was not practically possible to screen all the health workers including the surgeon and other staff before every surgery, thus there is a risk of getting infected from co-workers during scrubbing, owning, and gloving and surgeries.

Complex cases likely required lengthy hospital stays, which increases the risk of patient exposure to the virus, thus we started with routine simple cases.[18] We discharged our patient between the 4th to 6th day. Ding et al followed enhanced recovery after surgery (ERAS) protocol during a pandemic and compared shorter postoperative stay with the pre-pandemic era. Found that there was no significant difference in postoperative complication and readmission rate when compared with the pre-pandemic era.[19]

CONCLUSIONS

Communication, precautions, and proper preoperative planning remain an essential part of management at each step of treatment. Although arthroplasty being an elective procedure, by following above mentioned standard operative procedure (SOP) chances of getting an infection of COVID-19 is negligible from operative work. Telecommunication enable us to keep us as well as patient safe during the surge of pandemic at the cost of minimal compromise of health care. Following COVID-19 guidelines and appropriate precautions to ensure safety during operative work as well as outpatient and inpatient care is essential.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.
Financial or other competing interests: None.
Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

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