Retrospective Study

Locking compression plate + T-type steel plate for postoperative weight bearing and functional recovery in complex tibial plateau fractures

Hai-Feng Li, Tao Yu, Xing-Fei Zhu, Hua Wang, Ying-Qi Zhang

ORCID number: Hai-Feng Li 0000-0002-0856-9782; Tao Yu 0000-0002-7537-6710; Xing-Fei Zhu 0000-0002-1064-6628; Hua Wang 0000-0002-2986-0261; Ying-Qi Zhang 0000-0002-4616-6888.

Author contributions: Li HF and Yu T designed this retrospective study; Li HF, Yu T and Zhu XF wrote this paper; Li HF, Yu T, Zhu XF, Wang H and Zhang YQ were responsible for sorting the data.

Institutional review board statement: The study was reviewed and approved by the Tongji Hospital Institutional Review Board.

Informed consent statement: Patients were not required to give informed consent to the study because the analysis used anonymous clinical data that were obtained after each patient agreed to treatment by written consent.

Conflict-of-interest statement: The authors declare that they have no conflict of interest.

Data sharing statement: No additional data are available.

Country/Territory of origin: China

Abstract

BACKGROUND

Complex tibial plateau fractures can seriously affect quality of life and physical and mental health of patients. The anatomical relationship between the proximal tibial bone and soft tissue is complex, resulting in different types of tibial plateau fractures. Violent trauma can lead to displaced fracture, serious soft tissue injury, and potentially, dislocation of the knee joint. Therefore, tibial plateau fractures are extremely unstable.

AIM

To assess the use of locking compression plate (LCP) + T-type steel plate for postoperative weight bearing and functional recovery of complex tibial plateau fractures.

METHODS

Ninety-seven patients with complex tibial plateau fractures who underwent surgery at our hospital were selected for retrospective study. Forty-nine patients had been treated with LCP + T-type steel plate limited internal fixation (study group), and 48 patients with bilateral ordinary steel plate support (control group). The operation process index, postoperative rehabilitation related index, Rasmussen score of the knee joint, tibial plateau varus angle (TPA), tibial plateau retroversion angle (PA), and surgical complications of the two groups were compared.

RESULTS

The operation time and intraoperative bone graft volume in the study group were
Tibial plateau fracture is one of the most common types of fractures in clinical practice. It is frequently caused by violent trauma to the tibial plateau that results in the fracture and even articular surface collapse. It can be accompanied by serious knee varus and joint instability, which has a major impact on the activity and function of the knee joint. Patients with complex tibial plateau fractures are prone to developing skin necrosis, incision site infection, and joint instability after surgery; thus, early active treatment is needed[1]. The clinical treatment criteria for complex tibial plateau fractures recommends anatomical reduction, firm and stable fixation, and early training. Currently, operational treatment requires good biomechanical function, anatomical reduction of the articular surface, and reduction of soft tissue damage. In the past, double plate internal fixation was used in clinical practice; however, the procedure involved adjunct stripping of soft tissue, resulting in increased postoperative complications[2,3]. Clinical application of the locking plate can not only reduce damage to the soft tissue but also the incidence of postoperative necrosis. However, the stability of the articular surface fixed with a locking steel plate alone, cannot be guaranteed[4]. In this study, locking compression plate (LCP) + T-shaped steel plate limited internal fixation was used to treat complex tibial plateau fractures to find a more reliable internal fixation method for use in clinical practice.

INTRODUCTION

Tibial plateau fracture is one of the most common types of fractures in clinical practice.
MATERIALS AND METHODS

Study design
A total of 97 patients with complex tibial plateau fractures who underwent surgery at our hospital were selected for retrospective study. Based on the operation method, 49 patients who were treated with LCP + T-type steel plate limited internal fixation were included in the study group, and 48 patients who were treated with bilateral ordinary steel plate support were included in the control group. The inclusion criteria were as follows: (1) Complex tibial plateau fractures with a clear history of trauma; (2) Closed fracture type; (3) Main clinical symptoms of lower limb pain, swelling, deformity, and dysfunction; (4) Diagnosis of the complex tibial plateau fracture by X-ray and computed tomography; (5) Age 19 to 59 years; (6) Schatzker type V-VI; and (7) Surgery undertaken within 2 wk after the trauma. The exclusion criteria were as follows: (1) Fractures caused by diseases (malignant bone tumor, bone tuberculosis, severe osteoporosis); (2) Presence of hematological diseases; (3) Simultaneous occurrence of severe vascular and nerve injury or soft tissue defects, and a contaminated wound; (4) Mental or intellectual impairment; and (5) Presence of other diseases leading to muscle atrophy or neurological disorders.

Operation method
In the study group, LCP + T-type steel plate limited internal fixation had been performed. The patient was placed half supine, and the affected knee was raised and flexed at approximately 30° with external rotation. A posteromedial incision 8–12 cm in length was made at the posterior edge of the semitendinosus muscle. Entry was at the muscle space between the gastrocnemius muscle and medial head of the semitendinosus muscle. The semi-membranous muscle was cut and pulled medially. The joint capsule was then cut. The medial meniscus was pulled to the femoral side with a meniscus hook to expose the medial and lateral articular surfaces of the tibial plateau. The posteromedial tibial plateau was fixed with a T-shaped plate, and the lateral tibial plateau condyle fracture was treated with a bone graft. After temporary fixation with a Kirschner wire, C-arm fluoroscopy was performed to confirm recovery of the articular surface height. The LCP was selected and adjusted to the best position. A cortical bone screw was temporarily screwed into the appropriate position of the plate, and several locking screws were screwed into the proximal and distal parts of the plate.

In the control group, bilateral ordinary steel plate support was used. The patient was placed semi-supine on the fluoroscopic operating table and an arc incision was made along the adductor tuberosity of the femur, terminating at the medial side of the tibial tuberosity. The skin and subcutaneous tissue were incised to expose the medial expansion of the quadriceps femoris. The sartorius muscle and goose foot were gently pulled back to open the medial joint capsule. At the same time, the meniscus was pulled to the femoral side to clearly expose the medial platform. After fracture reduction, Kirschner wire fixation was used to confirm that the reduction was satisfactory, and an ordinary supporting plate was inserted. After fracture block reduction, an appropriate amount of artificial bone or allogeneic bone was implanted in the bone defect. After confirming that the height of the articular surface was restored, the ordinary supporting plate was selected, and several cancellous lag screws and cortical screws were successively screwed into the proximal and distal parts of the plate.

Observation indices
Operation time, blood loss, anterior external incision length, intraoperative bone graft volume, postoperative drainage volume, hospitalization duration, fracture healing time, complete weight-bearing time, Rasmussen score, tibial plateau varus angle (TPA), tibial plateau retroversion angle (PA), and postoperative complications at different points after surgery in the two groups were assessed and compared.

The Rasmussen score was used to evaluate mainly two aspects the knee joint function: (1) Subjective aspects: degree of pain (6 points) and walking ability (6 points). Based on the findings of physical examination by clinicians, each item of knee stability, knee extension, and range of motion was scored, the highest score being 6; the total scores were classified as excellent (≥ 27), good (20–26), medium (10–19), or poor (< 10); and (2) Radiology: the main outcome measures included condylar widening, articular surface collapse, and angulation deformity, with the highest score of 6 for each evaluation item; the total scores were classified as excellent (18), good (12–17), medium (6–12), or poor (< 6).
The patients were followed up by telephone or by clinic visits for routine examination. The patients were examined and assessed for postoperative complications and knee function recovery. The follow-up duration was at least 18 mo.

**Statistical analysis**

SPSS 21.0 (IBM Corp., Armonk, NY, USA) was used for data analysis. Quantitative data such as the operation time and intraoperative bone graft volume were expressed as mean ± SD; *t*-test was used to analyze the differences between the two groups. Qualitative data, such as the complication rate, were analyzed using the χ² test. *P* < 0.05 was considered statistically significant.

**RESULTS**

**Patient characteristics**

In the study group, the average age was 38.3 ± 8.5 years (range, 23-55 years). There were 31 males and 18 females. The time interval between the fracture and operation was 7.9 ± 1.2 d. There were 27 fractures on the left side and 22 on the right side. The Schatzker classifications were type V in 22 cases and type VI in 27 cases (Figure 1). The causes of injury were traffic accidents in 31 cases, falls in 11 cases, and other causes in 7 cases.

In the control group, the average age was 40.0 ± 7.2 years (range, 25-56 years). There were 28 males and 20 females. The time interval between the fracture and operation was 8.1 ± 1.1 d. There were 24 cases on the left side and 24 cases on the right side. The Schatzker classifications were type V in 20 cases and type VI in 28 cases. The causes of injury were traffic accidents in 27 cases, falls in 9 cases, and other causes in 12 cases. There was no significant difference in the baseline data between the two groups (*P* > 0.05).

**Comparison of operation status and postoperative hospital stay between the two groups**

Operation time and intraoperative bone graft volume were lower in the study group than in the control group (*P* < 0.05). There was no statistically significant difference between the two groups in surgical bleeding, anterior external incision length, postoperative drainage, and duration of hospital stay (*P* > 0.05) as shown in Table 1.

**Comparison of postoperative fracture healing between the two groups**

Full load bearing was earlier in the study group than in the control group (*P* < 0.05). There was no statistically significant difference between the study group and the control group in the fracture healing time (*P* > 0.05, Table 2).

**Comparison of the angles of TPA and PA between the two groups**

There was no statistically significant difference between the two groups in the angles of TPA and PA both immediately after surgery and 18 mo thereafter (*P* > 0.05, Table 3).

**Comparison of knee joint function between the two groups**

At 12 mo after surgery, the Rasmussen scale subjective evaluation score was significantly higher in the study group than in the control group (*P* < 0.05). However, there was no significant difference between the two groups in the Rasmussen scale subjective evaluation score at 18 mo after surgery and in the radiology score at 12 and 18 mo after surgery (*P* > 0.05, Table 4).

**Comparison of surgical complication rates between the two groups**

The postoperative complication rate was significantly lower in the study group than in the control group (3.77% vs 15.09%, *P* < 0.05) as shown in Table 5.

**DISCUSSION**

The tibial plateau consists of the medial platform, lateral platform, and intercondylar ridge. The bone density of the lateral platform is less than that of the medial platform. When suffering localized trauma, the lateral platform is more prone to split or
Li HF et al. LCP + T-type steel plate in complex tibial plateau fractures

### Table 1 Comparison of the operation status and length of postoperative hospital stay between the two groups (mean ± SD)

| Group        | n   | Operation time (min) | Surgical bleeding (mL) | Anterior external incision length (cm) | Intraoperative bone graft (g) | Postoperative drainage (mL) | Postoperative hospital stays (d) |
|--------------|-----|----------------------|------------------------|----------------------------------------|------------------------------|----------------------------|---------------------------------|
| Study group  | 49  | 118.3 ± 14.0         | 339.4 ± 38.0           | 17.5 ± 2.2                             | 7.10 ± 1.87                  | 139.4 ± 34.0                | 7.4 ± 1.5                       |
| Control group| 48  | 130.1 ± 16.3         | 344.1 ± 42.6           | 17.8 ± 2.6                             | 9.23 ± 2.04                  | 143.8 ± 39.6                | 7.8 ± 1.7                       |
| t value      | 0.000 | -3.827               | -0.574                 | -0.614                                 | -5.362                       | -0.588                     | -1.229                           |
| P value      | 0.000 | 0.568                 | 0.541                  | 0.000                                  | 0.558                        | 0.222                      |                                  |

### Table 2 Comparison of postoperative fracture healing between the two groups (mean ± SD)

| Group        | n   | Fracture healing time (wk) | Full load time (wk) |
|--------------|-----|----------------------------|---------------------|
| Study group  | 49  | 13.5 ± 1.7                 | 14.6 ± 1.2          |
| Control group| 48  | 14.0 ± 2.0                 | 16.2 ± 1.8          |
| t value      | 0.187 | -1.328                   | -5.161              |
| P value      |       | 0.000                     | 0.000               |

### Table 3 Comparison of the angles of tibial plateau varus angle and tibial plateau retroversion angle between the two groups of patients at different times after surgery (mean ± SD)

| Group        | n   | TPA angle (*) | PA angle (*) |
|--------------|-----|---------------|--------------|
|              |     | Immediately after surgery | 18 mo after surgery | Immediately after surgery | 18 mo after surgery |
| Study group  | 49  | 86.34 ± 3.81 | 86.04 ± 2.51 | 9.54 ± 2.20 | 9.83 ± 1.72 |
| Control group| 48  | 86.51 ± 3.44 | 85.78 ± 2.92 | 9.31 ± 2.14 | 9.91 ± 1.84 |
| t value      | 0.818 | -0.231               | 0.471               | 0.522               | -0.221               |
| P value      |       | 0.639                     | 0.603                     | 0.825                     |

TPA: Tibial plateau varus angle; PA: Tibial plateau retroversion angle.

### Table 4 Comparison of knee joint function between the two groups (mean ± SD)

| Group        | n   | Subjective evaluation score (points) | Radiology evaluation (points) |
|--------------|-----|--------------------------------------|-------------------------------|
|              |     | 12 mo after operation | 18 mo after surgery | 12 mo after operation | 18 mo after surgery |
| Study group  | 49  | 18.84 ± 3.50 | 25.81 ± 2.50 | 10.41 ± 2.10 | 15.50 ± 1.32 |
| Control group| 48  | 16.57 ± 3.32 | 25.21 ± 2.64 | 10.13 ± 2.32 | 15.16 ± 1.27 |
| t value      | 0.001 | 3.276               | 1.150               | 0.623               | 1.292               |
| P value      |       | 0.253                     | 0.534                     | 0.199                     |

collapse. The anterior and posterior cruciate ligaments connect the femoral condyles and tibial intercondylar parts to stabilize the knee joint[5,6]. The medial collateral ligament ends in the marginal compartment of the medial platform; thus, when the medial platform fractures, the medial collateral ligament is prone to contusion or even rupture[7]. Currently, the clinical treatment goal for tibial plateau fracture reduction is anatomical reduction of the articular surface, preventing articular surface collapse or step formation, and firm and stable fixation, so as to obtain a long-term stable, well-aligned, normal, and painless joint, and prevent the occurrence of post-traumatic arthritis and other complications[8]. However, studies have found that complex tibial plateau fractures are often accompanied by other conditions including peripheral ligament injury, surrounding soft tissue swelling, joint instability due to an uneven
Table 5 Comparison of surgical complication rates between the two groups, n (%)

| Group         | n  | Incision infection | Delayed fracture union | Traumatic arthritis | Complication rate |
|---------------|----|--------------------|------------------------|--------------------|-------------------|
| Study group   | 49 | 1                  | 0                      | 1                  | 2 (3.77)          |
| Control group | 48 | 4                  | 1                      | 3                  | 8 (15.09)         |

χ² = 4.153

P value = 0.042

Figure 1 A 54-year-old male patient suffered a Schatzker type VI fracture on the right side due to a car accident. A-D: The patient received locking compression plate combined with T-plate treatment on day 6 after admission to the hospital. Re-examination of the X-ray results showed that the reduction was good, and the internal fixation was stable; E, F: The results of the re-examination at 18 mo after the operation. The patient’s fracture was completely healed.

Surgery is the main treatment modality for complex tibial plateau fractures; to ensure correct reduction and prevention of related complications, it is important to choose the correct operative approach. High-energy injuries can cause Schatzker type V and VI tibial plateau fractures. Most of the knee joint surface becomes severely comminuted and is accompanied by severe soft tissue injury due to intra-articular fractures. The purpose of treating intra-articular fractures is to restore the smoothness of the articular surface, axial alignment, stability of the joint, and normal functional activities of the joint. The treatment chosen at the time of operation must provide enough stability and allow the patient to exercise properly at an early timepoint.

In our study, the differences in the outcomes of LCP + T-type steel plate limited internal fixation and bilateral ordinary steel plate support were compared. Bilateral ordinary steel plate operation allows the surgical field to be clearly exposed, thus exposing the joint surface. Through the comprehensive exploration of the articular surface and meniscus ligament injury, the disadvantage of the short distance between the predetermined incision line and the auxiliary incision line in the bilateral incision of the knee can be overcome. However, large soft tissue flaps need to be separated from the medial and lateral sides during the operation, which may cause more injury to patients and require physicians to have higher technical skill.

In LCP + T-type steel plate limited internal fixation, an anterolateral conventional incision combined with small posteromedial limited incision can be used to expose each part of the medial and lateral plateau, allowing for the accurate reduction of fracture fragments from different angles and orientations and enabling the management of posterior articular surface, and acute varus.
Li HF et al. LCP + T-type steel plate in complex tibial plateau fractures

CONCLUSION

In conclusion, LCP + T-type steel plate limited internal fixation treatment has the...
advantage of less trauma and enables early postoperative functional exercise to promote functional recovery and lower limb weight-bearing besides being associated with less postoperative complications.

ARTICLE HIGHLIGHTS

Research background
Tibial plateau fracture has a serious impact on the movement and function of the knee joint, resulting in serious dysfunction. The clinical application of locking plate can not only reduce soft tissue injury, but also reduce the occurrence of postoperative necrosis, but the stability of articular surface of locking plate can not be guaranteed. In this study, locking compression plate (LCP) and T-shaped plate were used to treat complex tibial plateau fractures, in order to find a more reliable method of internal fixation for clinic.

Research motivation
This study compared the difference between bilateral common plate support and LCP+ T plate limited internal fixation. Bilateral common plate peeling during operation can make the operative visual field more clearly exposed and expose the articular surface. Through omni-directional exploration of articular surface and ligament meniscus injury, it can further improve the disadvantage of too short distance between predetermined incision line and auxiliary incision line in bilateral incision of knee joint.

Research objectives
This study aimed to explore a surgical method for the treatment of complex tibial plateau fractures with less trauma, faster postoperative recovery and fewer postoperative complications.

Research methods
Operation time, blood loss, anterior external incision length, intraoperative bone graft volume, postoperative drainage volume, hospitalization duration, fracture healing time, complete weight-bearing time, Rasmussen score, tibial plateau varus angle, tibial plateau retroversion angle, and postoperative complications at different points after surgery in the two groups were assessed and compared.

Research results
In our study, operation time and intraoperative bone graft volume in the study group was less in the study group than in the control group, indicating that LCP + T-type steel plate limited internal fixation for complex tibial plateau fractures can shorten the operation time and reduce intraoperative bone graft. LCP + T-type steel plate limited internal fixation for the treatment of complex tibial plateau fractures can reduce the incidence of postoperative complications.

Research conclusions
LCP + T-type steel plate limited internal fixation treatment has the advantage of less trauma and enables early postoperative functional exercise to promote functional recovery and lower limb weight-bearing besides being associated with less postoperative complications.

Research perspectives
It is necessary to expand the sample size, conduct long-term follow-up, and carry out prospective trials for an in-depth demonstration of the superiority of LCP + T-type steel plate limited internal fixation over bilateral ordinary steel plate support in the treatment of complex tibial plateau fractures.

REFERENCES

1 Ramponi DR, McSwigan T. Tibial Plateau Fractures. Adv Emerg Nurs J 2018; 40: 155-161 [PMID: 30059369 DOI: 10.1097/TME.0000000000000194]
2 Jirangkul P, Jitprapaikulsam S, Songpatanaslip T. Outcomes Following Temporary Kapandji
Pinning Technique and Distal Radial LCP Fixation for Intra-Articular Fractures of the Displaced Distal Radius. *Tech Hand Up Extrem Surg* 2019; 23: 38-43 [PMID: 30624394 DOI: 10.1097/BTH.0000000000000221]

3 Buraṇapathana T, Apyavathakakul T, Apyavathakakul V. Anteromedial minimally invasive plate osteosynthesis (MIPO) for distal third humeral shaft fractures - Is it possible? *Injury* 2019; 50: 1166-1174 [PMID: 31072594 DOI: 10.1016/j.injury.2019.04.027]

4 Baum C, Leimbacher M, Kriechling P, Plata H, Cadosch D. Treatment of Periprosthetic Femoral Fractures Vancouver Type B2: Revision Arthroplasty Versus Open Reduction and Internal Fixation With Locking Compression Plate. *Geriatr Orthop Surg Rehabil* 2019; 10: 2151459319876859

5 Zeman J, Matějků T, Zeman P, Belatka J, Matějků J. [Outcomes of Treatment of Calcaneal Fractures Using Locking Compression Plate with or without Augmentation]. *Acta Chir Orthop Traumatol Cech* 2019; 86: 413-418 [PMID: 31941568]

6 Bernholt DL, Dornan GJ, DePhilippo NN, Aman ZS, Kennedy MI, LaPrade RF. High-Grade Posterolateral Tibial Plateau Impaction Fractures in the Setting of a Primary Anterior Cruciate Ligament Tear Are Correlated With an Increased Preoperative Pivot Shift and Inferior Postoperative Outcomes After Anterior Cruciate Ligament Reconstruction. *Am J Sports Med* 2020; 48: 2185-2194 [PMID: 32667268 DOI: 10.1177/0363546520932912]

7 McGonagle L, Cordier T, Link BC, Rickman MS, Solomon LB. Tibia plateau fracture mapping and its influence on fracture fixation. *J Orthop Traumatol* 2019; 20: 12 [PMID: 30806822 DOI: 10.1186/s11199-019-0519-1]

8 Fabris V, Reginato VF, Smaniotto C, Bacchi A, Consani RLX. Treatment of Resorbed Mandibles with Titanium Plate and Immediate Implant-Supported Prosthesis - Case Series. *Braz Dent J* 2019; 30: 244-251 [PMID: 31166396 DOI: 10.1590/0103-6440201902397]

9 Santana A Junior, Debeustianc JC, Kunz RI, Buratti P, Brancalhão RMC, de Fátima Chasko Ribeiro L, Torrejais MM, Bertolini GRF. Association of sericin and swimming on the phenotype, motor plate, and functionality of the denervated plantar muscle of Wistar rats. *J Exerc Rehabil* 2018; 14: 24-31 [PMID: 29511649 DOI: 10.12965/jer.1835138.569]

10 Garner MR, Warmer SJ, Lorich DG. Surgical Approaches to Posterolateral Tibial Plateau Fractures. *J Knee Surg* 2016; 29: 12-20 [PMID: 26480345 DOI: 10.1055/s-0035-1564731]

11 Shur VB, Maležík V, Svyatkovský V. Posterolateral Spiral-Shaped One Third Tubular Plate Stabilization for a Long Spiral Fracture of the Lateral Malleolus. *J Foot Ankle Surg* 2018; 57: 579-582 [PMID: 29685568 DOI: 10.1053/j.foot.2017.10.029]

12 Kempthorne J, Kieser DC, Walker CG. Optimal plate fixation of distal femoral fractures in the presence of a well fixed cemented hip arthroplasty femoral stem. *Hip Int* 2018; 28: 657-662 [PMID: 29783902 DOI: 10.1177/112070018760243]

13 Duan KD, Huang JR. [Progress in diagnosis and treatment of posterior condylar fracture of tibial plateau]. *Zhongguo Gu Shang* 2019; 32: 1173-1176 [PMID: 31870082]

14 Garnavos C. Intramedullary Nailing with a Suprapatellar Approach and Condylar Bolts for the Treatment of Bicondylar Fractures of the Tibial Plateau. *JBJS Open Access* 2017; 2: e0017 [PMID: 30229216 DOI: 10.2106/JBJS.OA.16.00017]

15 Karakasli A, Acur N, Uzun B. Straight-Forward versus Bicortical Fixation Penetrating Endplate in Lumbosacral Fixation-A Biomechanical Study. *J Korean Neurosurg Soc* 2018; 61: 180-185 [PMID: 29526060 DOI: 10.3340/jkns.2017.0404.004]

16 Yuan GH, Zheng X, Chen K. [Combined surgical approaches in the treatment of complex tibial plateau fractures]. *Zhongguo Gu Shang* 2017; 30: 89-92 [PMID: 29327559 DOI: 10.3969/j.issn.1003-0034.2017.01.021]

17 Adams JDJ Jr, Loeffler MF. Soft Tissue Injury Considerations in the Treatment of Tibial Plateau Fractures. *Othrop Clin North Am* 2020; 51: 471-479 [PMID: 32950216 DOI: 10.1016/j.ocl.2020.06.003]

18 Borrelli J Jr. Management of soft tissue injuries associated with tibial plateau fractures. *J Knee Surg* 2014; 27: 5-9 [PMID: 24357043 DOI: 10.1055/s-0033-1363546]

19 Tran AA, Shen J, Wernecke C, Gatewood CT, Harris AHS, Dragoo JL. A comparison of the Functional Movement Screen™ and the Landing Error Scoring System: A cohort study. *Curr Orthop Pract* 2020; 31: 8-12 [PMID: 32454929 DOI: 10.1016/j.cocj.2020.02.002]

20 Rudran B, Little C, Wiik A, Logishetty K. Tibial Plateau Fracture Anatomy: Diagnosis and Management. *Br J Hosp Med (Lond)* 2020; 81: 1-9 [PMID: 33135915 DOI: 10.12968/hmed.2020.0339]
