

Outcomes for cemented dual mobility cup to treat recurrent instability; A UK case series

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ABSTRACT

Objectives: Recurrent dislocation of Total Hip Replacement (THR) is often multifactorial and remains a significant surgical challenge with a significant risk of further instability. Dual Mobility Cups (DMC) have been used widely with good long term results in France with few studies in the British literature, especially assessing their use for recurrent instability. We set out to assess whether recurrent instability can be successfully treated solely with revision of acetabular component to a dual mobility cup.

Methods: We retrospectively reviewed a prospectively collected electronic database for all consecutive dual mobility cups implanted to address recurrently instability in THR. Radiological and clinical data have been analysed.

Results: From September 2013 to September 2017 54 dual mobility cups have been implanted, mean age 78 (range 49–97). 47 were 1st time revision procedures, 7 were following previous revisions including 5 failed PLADs. Average time post primary was 10 years (range 8 months–23 years). Twenty cases are cement in cement revisions which has become our primary technique for revision of cemented cups. Mean follow up is 1.9 years (range 6 months–5 years), 37 cases have 2 year follow up available. 8 patients have died. There have been no episodes of further instability. One patient has had reoperation for infection (1st stage revision).

Conclusions: This series demonstrates satisfactory early to mid-term results for the use of dual mobility cups to treat recurrent instability. The technique is particularly useful when femoral components are well fixed and can be used with monoblock implants such as the Charnley stem. Cement in cement revision is a convenient technique and potentially reduces complications and cost. Further analysis of longer term data is required but these results suggests this could be a valid solution to a complex problem.

1. Introduction

Total hip arthroplasty remains one of the most successful and cost effective surgical procedures available. Reported 10 year revision rates of 4% in the United Kingdom National¹ Joint Registry and 4.5% in the Australian National Joint Replacement Registry² demonstrate an excellent survival benchmark. Success has driven amplified demand with significant increase in the number of procedures performed worldwide and subsequent increasing revision burden. Dislocation after hip arthroplasty is a significant complication with incidences after primary and revision procedures reported up to 7% and 25% respectively.³ Instability is the third most common cause of revision.⁴ Recurrent dislocation following THR poses a significant problem to the surgeon and often has complex and multifactorial aetiology. There is no ‘gold

standard’ approach to revision surgery in the literature – options include but are not limited to; upsizing of modular components, addressing component malposition, increasing offset and the use of constrained cups.⁵ Further instability remains a significant risk reported at 14.6% at a mean of twelve months after revision surgery.⁶

Dual mobility acetabular components, developed by Bosquet and Rambert in the mid 1970's, have been used in both primary and revision settings with good results mainly reported in the French literature.⁷ There are few studies reporting their use as the sole treatment for recurrent instability. DMC consists of a small head articulating with a large polyethylene liner, which in turn articulates with an acetabular shell. The design increases impingement free arc of movement and jump distance, with resultant theoretical increase in stability.

We have previously reported our unsatisfactory results with

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Posterior Lip Acetabular Devices (PLAD) used for recurrent instability⁸ and our use of dual mobility sockets was influenced by this. We report our experience of treating recurrent instability solely with revision of acetabular component to a dual mobility cup.

2. Methods

Consecutive case series from September 2013 to September 2017 of revisions to Dual Mobility Cup (RDMC) performed for recurrent instability. Data was collected retrospectively using Quadramed (Quadramed Corporation, Virginia, USA) and Bluespiner (Bluespiner International, Worcester, UK), electronic patient record systems, and Centricity Picture Archiving and Communications System (PACS) (GE Healthcare, Buckinghamshire, UK). Data collected included patient demographics, date of RDMC procedure, date of original surgery (if known) and type of implant, any previous revision surgery, peri-operative length of stay for RDMC procedure and complications. Operation notes were reviewed to identify technique of implantation (i.e. whether cement in cement). If present pre and post-operative oxford hip scores were analysed. Follow up clinic letters and radiographs were scrutinised. Data was analysed using Microsoft Excel.

3. Results

54 patients were identified and demographic data is demonstrated in Table 1.

In all cases a cemented dual mobility socket was implanted. Of the cohort 22 cases were planned elective admissions and 32 were admitted with acute recurrent dislocation as emergency cases, proceeding to have the RDMC on the same admission. Mean length of stay for the two groups was 5 days and 9 days respectively. Of the cohort 47 were first time revision procedures, 7 were following previous revisions including 5 failed PLADs. In twenty of the cases a 'cement in cement' technique was used. In all cases the femoral component was not revised, 19 of the cases were monobloc Charnley stems.

Mean follow up of the cohort is 1.9 years (range 6 months– 5 years), 37 patients have minimum two year follow up data. 8 patients have died – of these 5 had minimum 1 year follow up. Pre and post-operative oxford hip scores are available for 25 cases. All show improvement; with a mean improvement in score of 18 (range 8–37).

There have been no further episodes of instability in the cohort during this follow up. One patient has had a first stage revision procedure for peri-prosthetic infection, further debridement has failed to eradicate infection and patient remains on suppressant antibiotics. One patient has had successful shock wave lithotripsy treatment for lateral hip pain.

4. Discussion

The management of recurrently unstable THR is a challenging conundrum for surgeons. Single episodes of instability are often managed with closed reduction; however recurrent instability is common with a reported rate of re-dislocation requiring revision surgery of 51%.⁹ Surgical management is often indicated for recurrent instability unless the patient is not medically fit for anaesthetic or chooses not to undergo further surgery. There is no universally agreed stratagem⁵;

Table 1
Patient demographic data.

Number of patients	54
Age (mean)	78 (range 49–97)
Sex Ratio	42 f: 12 m
Time since original surgery (mean)	10 years (range 2 months–25 years)

many authors propose identifying and addressing aetiological factors.^{10,11} Multiple aetiologies often co-exist and successfully identifying and addressing these can be extremely challenging. Established treatment approaches including constrained liners have yielded relatively high rates of re-dislocation and failure.^{12–14} Dual mobility cups have been used extensively in France for three decades with good results in primary and revision settings.¹⁵ They are gaining popularity internationally for patients at high risk of instability including hip fractures, neuromuscular diseases and multiple revisions.⁷ In recurrent instability dual mobility is an attractive option as it only requires changes to the acetabular component and femoral head, simplifying revision procedures and potentially saving operative time and finance. In our region of the United Kingdom many historic THRs have used cemented monobloc Charnley stems and cemented all polyethylene cups. These can present with late instability due to polyethylene wear (Fig. 1), often the stem remains well cemented and stable as per the 19 in this cohort.

Typically treatment for this has involved the use of PLAD, but our results with this device have been unsatisfactory.⁸ Given some manufacturers do not now offer acetabular cups compatible with 22.25 mm heads and small heads have a low jump distance and primary arc range a revision of both components would be necessary to address the instability. The dual mobility system we use allows for retention of the original stem with 22.25 mm head and application of the dual mobility polyethylene component directly on to the stem (Fig. 2). Our technique has evolved and now our standard would be to perform 'cement in cement' revision of the acetabular component if the cement mantle is intact at the time of surgery (Fig. 3) potentially reducing bone loss associated with cement removal and operative time.

Large series in the French literature have reported mid to long term results for RDMC specifically for recurrent instability,^{16–18} these have shown low rates of further dislocation ranging from 3.8 to 5.8% over 7–13 years. Our cohort represents the largest single centre series of RDMC specifically for recurrent instability outside of France. Our re-dislocation rate of 0% is encouraging in this early to mid-term series and matches that reported by a group in the Netherlands¹⁹ and similar to a Swedish review of joint registry outcomes.²⁰ The low revision rate for all causes in the current series of 1.85% at an average follow up of 1.9 years also mirrors the figures in the wider literature.^{15–21}

The current study is limited by the retrospective design, lack of long term data for the cohort and small cohort size. We are somewhat restricted by the fact this is an emerging technique and our series represents our complete experience with this approach (with minimum 6 month follow up), we will continue to follow the cohort to inform long term outcomes. Other literature has suggested that dislocation following revision THR is predominately an early phenomenon and re-revision for this typically occurs in the first two years post operatively,¹⁹ potentially mitigating the limitation.

A further limitation is that Oxford Hip Score data is not available for all patients. This reduces the significance of the finding of improvement in all cases; however the trend observed would suggest this technique does improve patient function and experience.

5. Conclusion

This series demonstrates encouraging early to mid-term results for revision to dual mobility cup to treat recurrent instability. The technique is particularly useful when femoral components are well fixed and can be used with monoblock implants such as the Charnley stem. Cement in cement revision is a convenient technique and potentially reduces complications and cost. Further analysis of longer term data is required but these results suggest this could be a valid solution to a complex problem.

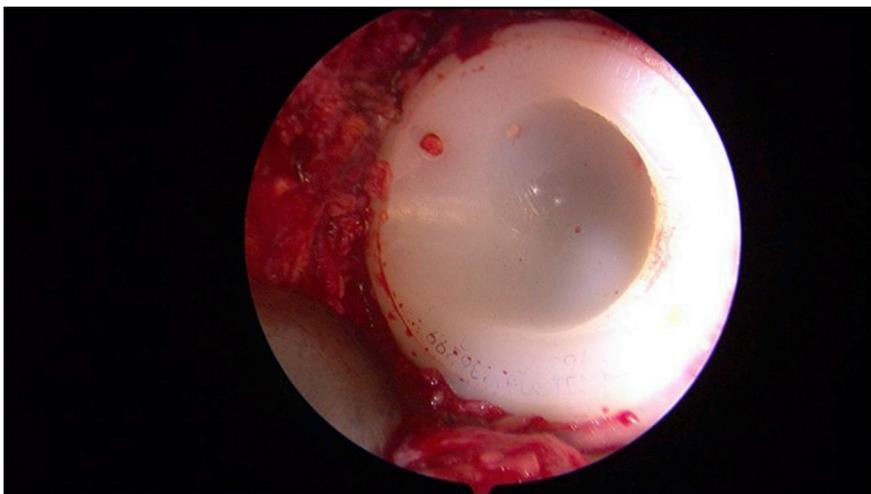


Fig. 1. Intraoperative picture of all polyethylene cup showing posterior wear.

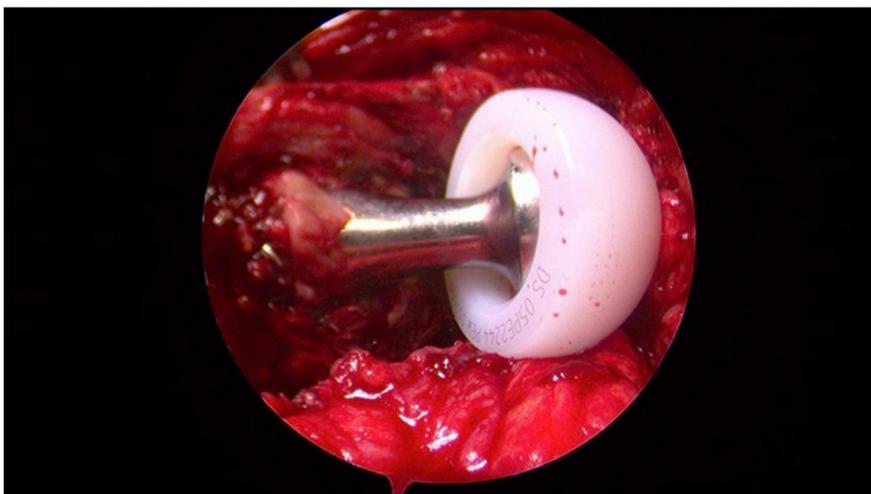


Fig. 2. Intraoperative picture of retained Charley stem and dual mobility polyethylene component in situ.

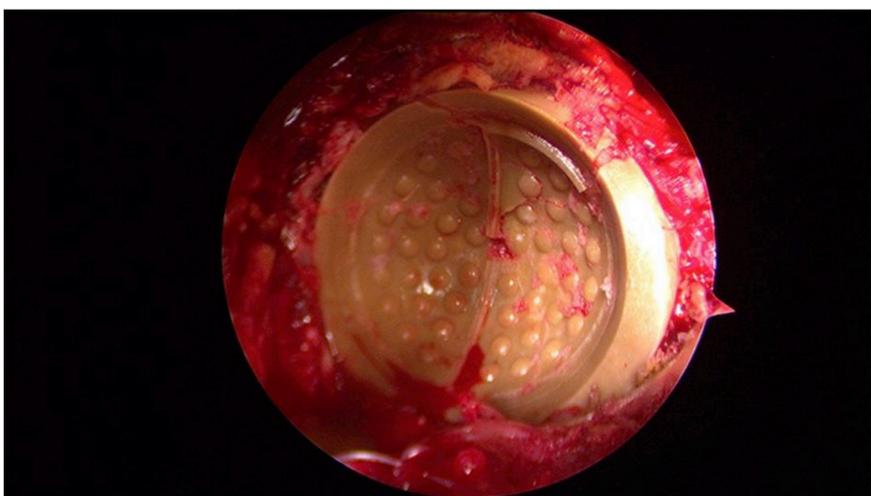


Fig. 3. Intraoperative picture of intact cement mantle following removal of polyethylene cup.

Conflicts of interest

None.

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None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jor.2019.02.025>.

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