Total hip arthroplasty consent process: current evidence for junior doctors

Junior doctors often obtain consent for total hip arthroplasty, despite recognized complications not being sufficiently taught during undergraduate medical training. This article provides current evidence regarding total hip arthroplasty complications which can be relayed to patients during the informed consent process.

Total hip arthroplasty is an extremely successful treatment for end stage arthritis. With an ageing population and increasing longevity the numbers of total hip arthroplasties performed annually are projected to rise, placing more responsibility on junior doctors to obtain informed consent. Total hip arthroplasty has recognized complications which may not have been sufficiently taught during undergraduate medical training, leading to poor and variable documentation of informed consent (Beresford-Cleary et al, 2011), and eventual medicolegal litigation (McWilliams et al, 2013a). In an epoch of increasing compensation claims and defensive medicine, junior doctors must be educated about the importance of documenting factual informed consent.

Consent process

The consent process can be completed in a single stage or a two-stage process. The first stage would include provision of information including conservative, operative and alternative treatments with an explanation of risks and benefits of each (Anderson and Wearne, 2007). The clinician would seek to gain written informed consent confirming the patient's initial decision to continue with operative intervention during the second stage. For consent to be valid the patient must be able to comprehend, retain and weigh up the information before coming to an informed decision (Anderson and Wearne, 2007). The consent process may involve various health-care professionals including surgeons, anaesthetists and physiotherapists. It should ideally be completed before the day of surgery, by the operating surgeon or a health-care professional competent to do so.

Physicians with good patient rapport, who take time to explain, and who are available, have been shown to experience fewer malpractice suits (Adamson et al, 2000). This proves the importance of good communication and bedside manners alongside sound medical knowledge. Documentation of informed consent is also vital and the use of structured, procedure-specific consent forms have been shown to significantly improve this (Beresford-Cleary et al, 2011; Isherwood et al, 2013).

Benefit

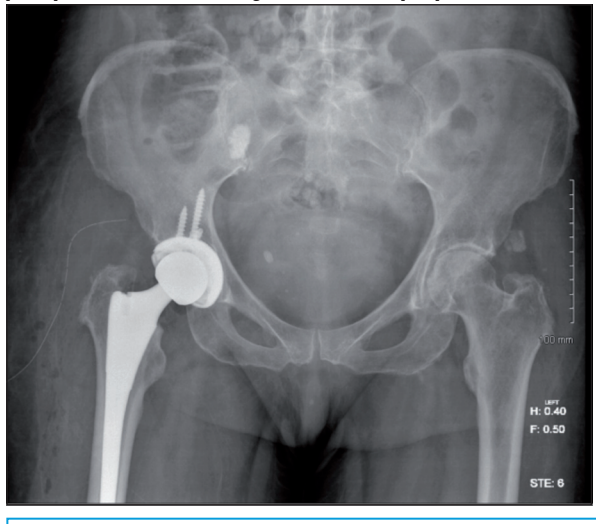
Total hip arthroplasty is one of the greatest advances in medicine of the modern era, significantly improving pain, function and quality of life (Jenkins et al, 2013) (*Figures 1* and *2*). This operative intervention is offered after conservative measures including lifestyle modification, analgesia and physiotherapy are no longer successful. Further, in times of economic restraint total hip arthroplasty has been proven to be cost effective, especially when compared to alternate medical interventions (Jenkins et al, 2013).

Major complications

Mortality

Despite being an exceptionally successful intervention total hip arthroplasty does have major risks including mortality, thromboembolism and periprosthetic infection. Patients undergoing routine elective primary total hip arthroplasty need not be necessarily consented for death. Mortality rates are extremely low, having fallen

Figure 1. An anteroposterior pelvis radiograph illustrating a postoperative uncemented right-sided total hip replacement.



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significantly from 0.56% in 2003 to 0.29% in 2011 in the first 90 days postoperatively (Hunt et al, 2013). The body mass index <19 kg/m^2, severe liver disease, metastatic cancer, congestive heart failure, myocardial infarction and renal failure are factors associated with increased mortality risk (Hunt et al, 2013). The consent should be tailored to individual patients depending on their preoperative physiological state. Patients undergoing total hip arthroplasty have a lower mortality than age-matched members of the general population.

Conversely patients undergoing total hip arthroplasty as treatment for traumatic hip fractures must be consented for death. Mortality rates are considerably higher with 10% at 1 month and 33% at 1 year (Roche et al, 2005).

Venous thromboembolism

Postoperative venous thromboembolism is a potentially fatal complication and patients must be informed about this. Despite venous thromboembolism prophylaxis the postoperative incidence of deep vein thrombosis and pulmonary embolus remains at 0.26% and 0.14% respectively (Januel et al, 2012). Chemical thromboprophylaxis, although highly effective, is associated with thrombocytopenia and major bleeding leading to delayed recovery, prolonged hospital stay, increased risk of prosthetic joint infection and need for revision surgery. Until recently guidance for venous thromboembolism prophylaxis following total joint surgery was controversial and inconsistent with little consensus among national organizations.

Figure 2. An anteroposterior left hip radiograph illustrating a postoperative cemented left-sided total hip replacement.

Guidance by the American College of Chest Physicians and the American Academy of Orthopaedic Surgeons has begun to share common goals including clinically symptomatic end-points (i.e. death, pulmonary embolism, symptomatic deep vein thrombosis), avoidance of bleeding and minimizing the importance of asymptomatic events (Barrack, 2012). They both advocate the use of low molecular weight heparin and intermittent pneumatic compression devices while an in-patient, extending thromboprophylaxis for 35 days, and assessing for bleeding diatheses (e.g. haemophilia) and active liver disease (*Table 1*). Both organizations recognize all chemical options for prophylaxis including aspirin but do not support one over the other, ultimately leaving thromboprophylaxis choice to the treating physician (Barrack, 2014). The role of inferior vena cava filters as prophylaxis is yet to be determined. Future studies to determine optimal methods of venous thromboembolism prophylaxis would benefit from collaboration between national organizations and joint registries.

Bleeding and haematoma

Bleeding and haematoma may result directly from the surgery. It may also be exacerbated by the use of anticoagulation for venous thromboembolism prophylaxis. Postoperative haematomas have a reported incidence of 0.8–1.7% and usually occur within the first 2 weeks after total hip arthroplasty (Parker et al, 2004). They increase wound tension and reduce tissue perfusion, leading to impaired wound healing, infection and dehiscence. This has a secondary impact of longer hospital stays, readmissions and morbidity. Patients can be reassured that the majority of postoperative haematomas are managed conservatively through close observation, regular dressing changes, and cessation of antiplatelet or anticoagulant medication. Prevention is the key and this is achieved intraoperatively through meticulous haemostasis. Operative intervention is indicated in cases of wound dehiscence, chronic drainage, infection, compartment syndrome and/or neurological impairment resulting from mass effect.

Patients can be assured that biochemical screening for bleeding diastheses and acute liver disease which risk bleeding and haematoma formation is routine (Barrack, 2012). Drains have been used traditionally in operations but data suggest that they add little benefit, incur expenditure and increase transfusion risk (Nanni et al, 2013). Tranexamic acid has received immense attention in the literature. It has been shown to significantly reduce operative blood loss and need for allogenic blood transfusions without any adverse effects (i.e. thromboembolic events

and infections) (Sukeik et al, 2011). Studies advocate its routine use in elective total hip arthroplasty with similar benefits stemming from topical use (Martin et al, 2013).

Periprosthetic joint infection

Periprosthetic joint infection is among the most feared complications of total hip arthroplasty. The overall incidence of periprosthetic joint infection ranges from 0.3% to 1.7% (Del Pozo and Patel, 2009). Patients must be reassured that several steps are undertaken preoperatively and intraoperatively to reduce periprosthetic joint infection. Preoperatively patients are screened for periprosthetic joint infection risk factors and optimized accordingly. Risk factors include advanced age, diabetes mellitus, obesity, malnutrition, surgical site infection, previous native joint infection, skin disorders (i.e. psoriasis), preexisting joint disease (i.e. rheumatoid arthritis) and patients who are otherwise immunocompromised secondary to medication intake (i.e. corticosteroids) or malignancy (Del Pozo and Patel, 2009).

The administration of perioperative antibiotics is an important prophylactic measure as recognized by the International Consensus Meeting on Periprosthetic Joint Infection (Parvizi et al, 2013). The infusion of a first generation cephalosporin is advised 1 hour before the surgical incision and used only for the first 24 hours postoperatively. This ensures adequate antibiotic tissue concentrations at the time of incision. In patients with known cephalosporin allergies clindamycin or vancomycin may be used.

Preparation of the surgical site is vital. Hair at the incision site should be removed with electric clippers as this is associated with fewer surgical site infections than the use of razors (Tanner et al, 2011). The skin may then be prepared with an alcohol-based solution which, according to a meta-analysis, is more effective at reducing surgical site infection (Dumville et al, 2013). Evidence suggests that preoperative skin preparation with 0.5% chlorhexidine in methylated spirits is associated with lower rates of surgical site infections than alcohol-based povidone iodine paint (Dumville et al, 2013). Further intraoperative strategies used to reduce infection include frequent changing of surgical gloves and there are some data to suggest that a dilute betadine lavage administered before wound closure leads to a decreased risk of periprosthetic joint infection (Brown et al, 2012).

Patients diagnosed with periprosthetic joint infection following total hip arthroplasty will require operative debridement and revision surgery either in a single operation (primary exchange) or in multiple stages. Traditional management with debridement, antibiotics and implant retention is no longer advocated except for the first 4 weeks after surgery (Parvizi et al, 2013).

Complications with significant morbidity

Neurovascular injury

Total hip arthroplasty is proven to alleviate pain and return patients to function. Every effort is taken to minimize complications directly related to the procedure which include neurovascular injury, leg length inequality, periprosthetic femoral fracture and dislocation. They result in significant morbidity and eventual litigation (McWilliams et al, 2013a).

Table 1. Summary of American Academy of Orthopaedic Surgeons 2011 and American College of Chest Physicians 2012 recommendations

Recommendation	Body	Grade*
Assess for bleeding diasthesis or liver disease	AAOS	Consensus
If at increased bleeding risk to receive intermittent pneumatic compression device or no prophylaxis	AAOS, ACCP	Consensus, 2C
If had previous venous thromboembolism to receive chemical and intermittent pneumatic compression device	AAOS	Consensus
Patients and physicians to discuss duration of prophylaxis	AAOS	Consensus
Advocate early mobilization	AAOS	Consensus
Against routine duplex ultrasonography screening before discharge	AAOS, ACCP	Strong, 1B
To use the following than no venous thromboembolism prophylaxis†: low molecular weight heparin, fondaparinux, dabigatran, apixaban, rivaroxaban, low-dose unfractionated heparin, vitamin K antagonist, aspirin	ACCP	1B
Intermittent pneumatic compression devices†‡	ACCP	1C
Use of low molecular weight heparin in preference to other agents	ACCP	2B
Inpatients to receive both chemical prophylaxis and intermittent pneumatic compression devices	ACCP	2C
Extending thromboprophylaxis to 35 days	ACCP	2B
In patients who decline injections: using apixaban or dabigatran	ACCP	1B

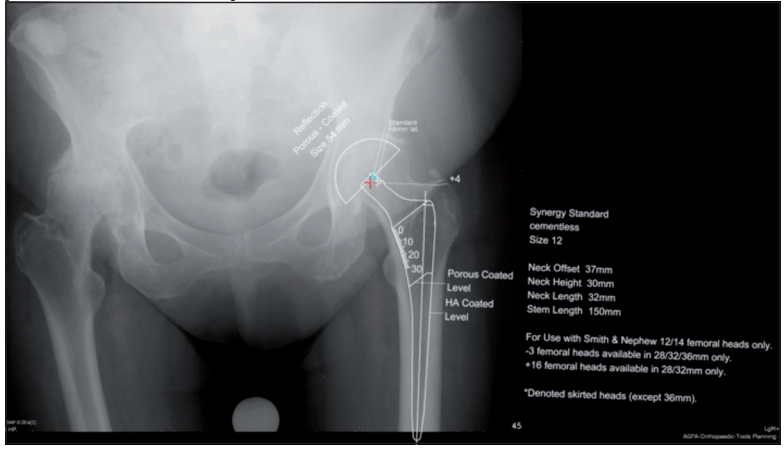
AAOS = American Academy of Orthopaedic Surgeons; ACCP = American College of Chest Physicians. *Grade 1 recommendations defined as those having a strong basis to indicate that the benefits outweigh risk, burden and cost: 1A required presence of randomized controlled trial with consistent results; 1B required presence of randomized controlled trial with inconsistent results or major methodological weakness; 1C required observational or other studies; grade 2 recommendations based on studies of less certain magnitude of benefits, risks, burdens and costs. † Length of treatment minimum 10–14 days; ‡ Recommended to use portable, battery-powered intermittent pneumatic compression devices, capable of recording and reporting proper wear time on a daily basis. 18 hours of daily compliance. Adapted from Barrack (2012).

Neurological injury has a reported incidence of 0.09% to 3.7% (Brown et al, 2008). Great care is taken intraoperatively to prevent nerve injury which can result through direct surgical trauma, compression from retractor placement, traction from limb-lengthening or reduction manoeuvres, and thermal pressure injury from cement. The sciatic nerve is injured in 90% of all postoperative nerve injury cases. Numerous risk factors for nerve injury have been implicated including developmental hip dysplasia, female gender and post-traumatic arthritis but none have been consistently reported to be significant (Brown et al, 2008). Exploration and neurolysis significantly reduces pain and is advocated as the treatment of choice in patients with sciatic nerve palsy and neuropathic pain (Kyriacou et al, 2013). Injuries to the femoral, obturator and superior gluteal nerves are rare.

It is mandatory to assess and document the lower limb neurovascular status of all total hip arthroplasty patients pre- and postoperatively. Patients who suffer a postoperative neurological injury are likely to have poor functional outcome leading to litigation, illuminating the importance of informed consent and addressing patient expectations (McWilliams et al, 2013a).

Vascular complications after total hip arthroplasty are rare and if identified promptly have good prognosis. This must be emphasized to patients, especially as Parvizi et al (2008) found that a legal suit was launched against the operating surgeon by the patient in 50% of vascular complication cases. A single-centre study on 12 822 total hip arthroplasty performed between 1989 and 2012 showed a vascular complication incidence rate of 0.1% (Troutman et al, 2013). Patients presented with acute limb ischaemia (58%), haemorrhage (12%), mixed presentation (12%) or pseudo-aneurysm (18%). The injury was recognized on the same day in 57% of patients. Fortunately all patients were successfully revascularized achieving 100% limb salvage with no mortality. Vascular structures may be injured by the same mechanisms that cause neurological injury with the external iliac artery, common femoral artery and external iliac vein being most at risk (Shoenfeld et al, 1990).

Figure 3. An anteroposterior pelvis radiograph of a patient that has been listed for a right-sided total hip replacement with an example of digital preoperative templating performed over the left hip.



Periprosthetic femoral fracture

A periprosthetic femoral fracture can occur intraoperatively or postoperatively. Intraoperative periprosthetic femoral fracture is most likely to occur during femoral stem insertion. Patients must be reassured that extreme care is taken during the procedure and this is reflected by an extremely low prevalence rate that ranges from 0.1% to 4% depending on the study reviewed (Schwarzkopf et al, 2013). Regardless patients must be consented for this complication which is associated with higher rates of mortality and risks further revision procedures (Schwarzkopf et al, 2013). Risk factors for periprosthetic femoral fracture include rheumatoid arthritis, Paget's disease, tumours, cortical defects, osteoporosis and revision surgery (Schwarzkopf et al, 2013).

If an intraoperative periprosthetic femoral fracture occurs the surgeon will be in an optimum position to delineate the extent of injury, visually and through intraoperative radiographs, before undertaking fixation. Periprosthetic femoral fracture is commonly classified according to the Vancouver classification which guides treatment. The primary goal of periprosthetic femoral fracture fixation is anatomical reduction and to ensure prosthetic fixation is stable which depends on the fracture pattern. Postoperative periprosthetic femoral fracture is usually sustained following a low energy fall from either sitting or standing.

Leg length inequality

Patients must be assured that it is the primary goal of orthopaedic hip surgeons to restore hip biomechanics and optimal leg length during total hip arthroplasty. It should be also explained that this is not possible in every case. A leg length inequality of 10 mm or less is common. It is usually well tolerated and clinically acceptable (McWilliams et al, 2013b). However, the degree of leg length inequality tolerated by each individual patient is unpredictable. It has been demonstrated that the impact of a small difference in leg length may be profound on individuals with pre-existing leg length inequality and lower physiological reserves (Gurney et al, 2001). Conversely patients with leg length inequality of 20 mm have been reported to remain asymptomatic (Gurney et al, 2001). Clinicians must understand that postoperative leg length inequality may result in patient dissatisfaction, poor outcome and litigation especially if the resultant leg length inequality causes nerve palsy (Maloney and Keeney, 2004; McWilliams et al, 2013a). This may be minimized if individuals at risk are identified and counselled appropriately.

Rigorous preoperative and intraoperative assessments are undertaken to restore hip biomechanics and leg lengths. Preoperative assessments encompass clinical examination, radiographic measurements and preoperative templating (*Figure 3*). These are essential tools in planning technical aspects of the operative procedure. In

the majority of cases symptomatic mild leg length inequality can be successfully managed conservatively with orthotics and gait correction (McWilliams et al, 2013b). Revision surgery is often a last resort but is an important option especially when nerve palsy has resulted from over-lengthening.

Instability

Postoperative dislocation is an important complication to discuss with patients (*Figures 4* and *5*). They must understand that even though total hip arthroplasty is hugely successful, patients are prevented from placing their operated limbs in certain positions (i.e. flexed, adducted and internally rotated). Practical postoperative instructions are to avoid crossing legs while sitting, bending forward past 90° at the waist, and sitting on low sofas, as all these positions increase the risk of postoperative hip dislocation. Further advice on lifestyle modifications, sleeping positions, dressing, washing and driving is imparted by the rehabilitation team.

The native hip is inherently more stable than an implanted prosthesis, fortunately the incidence of postoperative dislocation ranges from 0.2% to 1.7% (Zahar et al, 2013). It is regarded as the commonest early postoperative complication that may require revision surgery within the first 2 years of index procedure. Common mechanisms of dislocation are low energy trauma from falls and impingement. Impingement causes the head of the femoral component to lever out of the acetabular liner, and in 75% of cases this occurs posteriorly (Zahar et al, 2013). Patients can be reassured that the aim of the operation will be to ensure that the implanted prosthesis can provide a maximum range of impingement free motion. Stability is assessed through preoperative and intraoperative assessments alongside leg length inequality as already discussed. Factors increasing instability risk include extreme age, cerebral dysfunction, neuromuscular disease, alcoholism, prior hip surgery or traumatic hip fracture as an indication for total hip arthroplasty (Hailer et al, 2012; Zahar et al, 2013). Patients identified with these comorbidities should be thoroughly counselled during the consent process.

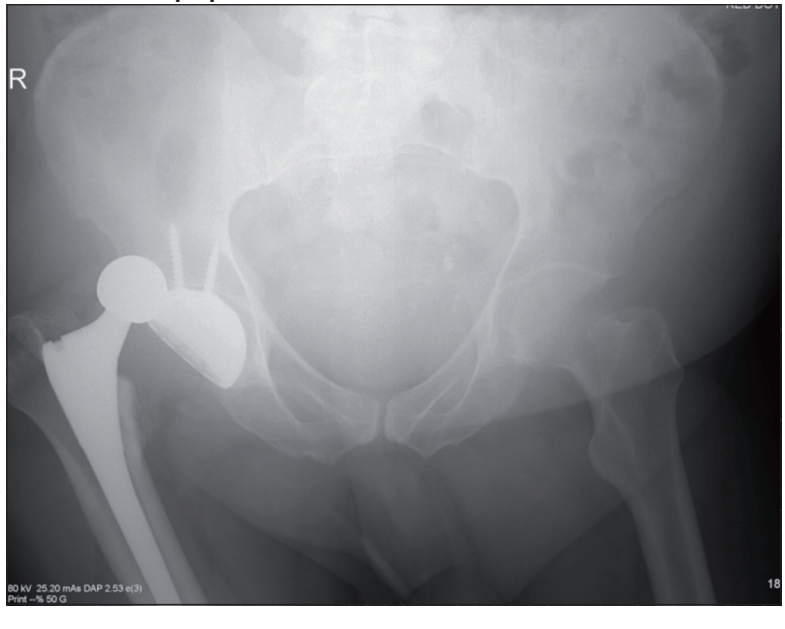
Patients diagnosed with a dislocated total hip arthroplasty require expeditious reduction of the implant. A closed reduction is attempted in the first instance. To perform a closed reduction, general anaesthesia with brief paralysis and fluoroscopy is preferred to prevent repeated reduction manoeuvres which can both harm the patient and damage the femoral head (Patel et al, 2007). Instability resulting from impingement secondary to implant malposition or inadequate soft tissue tension will require revision surgery.

Conclusions

Total hip arthroplasty is an extremely successful operation. It can dramatically improve patients' quality of life but is associated with specific risks. The British Orthopaedic Association (2006) hip guidelines recommend that the clinician spends 20–30 minutes with a patient during the consent process. In busy under-resourced departments this is a gargantuan task to accomplish especially in a single stage on the day of surgery. Some hospitals have introduced preoperative consent clinics which allow clinicians to use the two-stage consent process, allowing more time to build patient confidence as well as address their ideas, concerns and expectations. This will afford good patient rapport, better communication and time for documentation, which may lead to fewer malpractice suits. BJHM

Figure 4. An anteroposterior pelvis radiograph illustrating a dislocated right-sided cemented total hip replacement. Two orthogonal views (i.e. anteroposterior and lateral) should always be undertaken when evaluating any joint or bone.

Figure 5. An anteroposterior pelvis radiograph illustrating a dislocated right-sided uncemented total hip replacement.



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KEY POINTS

- Total hip arthroplasty is one of the greatest advances of modern medicine, significantly improving pain, function and quality of life.
- Total hip arthroplasty has recognized complications about which junior doctors may not have been sufficiently taught, leading to poor and variable documentation of informed consent.
- Major complications of total hip arthroplasty include venous thromboembolism and periprosthetic joint infection.
- Complications with significant morbidity include neurovascular injury, periprosthetic femoral fracture, leg length discrepancy and instability.
- Preoperative consent clinics may allow clinicians time to build good patient rapport, communicate effectively and document thoroughly, thereby reducing the risk of incurring a malpractice suit.