Spinal Anaesthesia in Day Surgery

Right Drug, Right Patient, Right Procedure

Spinal Anaesthesia in Day Surgery

Right Drug, Right Patient, Right Procedure

Contents

Consent: Choice is the Key

Foreword

Dr William Harrop-Griffiths
MA MBBS FRCA (Hon)
Consultant Anaesthetist at St Mary's Hospital and Honorary Clinical Senior Lecturer at Imperial College, London.
Past-President, Association of Anaesthetists of Great Britain and Ireland.
Carl Koller award 2017.

The UK's General Medical Council (GMC) regulates doctors and publishes authoritative guidance on medical practice. One of its key documents covers consent. The GMC's guidance is clear: patients should be offered information on alternative treatments; doctors must not withhold information necessary for patients to make informed decisions. In this "post-Montgomery" era, doctors are more aware than ever that they should base the consent process on full disclosure to, and an open discussion with, the patient. The days of medical paternalism are over. It would now be unthinkable for a surgeon not even to mention to a patient a procedure known to be simple, safe and effective for their condition simply because the surgeon favoured a different procedure. And yet, this sort of thing happens every day in many hospitals in the UK. Many anaesthetists offer patients the choice of regional anaesthesia (RA) or general anaesthesia (GA) when both are appropriate for the performance of the procedure the patient is about to undergo. However, many do not, and this is particularly true in Day Surgery Units. All too often, the default anaesthetic management is GA. All too often, patients are not given the choice of RA. All too often this is done in the belief that RA, and in particular spinal anaesthesia, is associated with delayed discharge after day case surgery. The evidence now available in the published literature suggests that this is no longer true. This handbook outlines the evidence supporting the safe and effective use of spinal anaesthesia with short-acting local anaesthetics for day case surgery. It also details the experience and guidance of clinicians successfully providing this form of anaesthesia on a daily basis.

Spinal anaesthesia with short-acting local anaesthetics is now a realistic alternative to GA for many day case procedures. It is not just best practice to offer patients this choice when it is reasonable for them and the procedure they are to undergo. It is arguably our duty as clinicians.

William Harrop-Griffiths

Right Drug, Right Patient, Right Procedure

Chapter One

With the increased predominance of day surgery[1] and the realised benefits of Enhanced Recovery After Surgery (ERAS),[2] your skills as an anaesthetist and the anaesthetic offered are of utmost importance.

As anaesthetists we need to think beyond general anaesthesia (GA), especially for day surgery. In the past anaesthetists only had long acting local anaesthetics for spinal anaesthesia, the sub-arachnoid block.[3] Attempts at short acting spinal anaesthesia with long acting local anaesthetics result in an unreliable and unpredictable block.[4 5 6] This factor has contributed to the benefits of spinal anaesthesia being underutilised and GA taking a predominant and supposed superior position in day-case anaesthesia.

Patient choice is a fundament of the GMC's (General Medical Council's) guidance on Good Medical Practice[7]: providing the patient with the correct information and choice of anaesthesia are fundamental to the consent process. If appropriate, spinal anaesthesia and its potential benefits must be explained and offered as a viable alternative to GA in an open and transparent way to the patient.

Innovations in local anaesthetics (LA) have resulted in high quality, safe and more predictable drugs for short-acting spinal anaesthesia.[8] These drugs allow for shared decision making and improved patient choice for those preferring or unable to have a safe GA.

The European Society of Regional Anaesthesia, on its European education website, describes spinal anaesthesia as,

"Easy, efficient, having low side effects, cost effective, with less post-operative confusion and post-operative cognitive deficit"

when compared to GA. Many anaesthetists have been stuck with the legacy of the past. This includes concerns about postoperative urinary retention (POUR), delayed mobilisation and discharge which has meant that clinicians have been reluctant to use short-acting spinal anaesthesia for day surgery.

We need to consider the benefits that short-acting spinal anaesthesia offers. Evidence shows that the technique can be more efficient in time and cost, with better patient satisfaction,[9 10] better immediate recovery and a faster discharge than modern GA.

Additionally, an opioid free short-acting spinal anaesthetic technique adheres to the goals of the Enhanced Recovery After Surgery programme (ERAS) and Multi Modal Analgesia (MMA).[11 12 13]

As more anaesthetists and hospital centres choose short-acting spinal anaesthesia, knowledge and expertise in the use of these drugs continues to grow.[14]

Right Drug, Right Patient, Right Procedure

Today's anaesthetist can offer the patient a variable duration of spinal block and, if needed, conscious sedation can offer the patient "sleep" – the only benefit a GA has over a spinal anaesthetic.[15]

However, unlike GA, we know exactly the mechanism of action of LA and can offer a safe, predictable and reliable anaesthetic.

"Right Drug, Right Patient, Right Procedure"

In order to perform effective spinal anaesthesia in the day surgical environment it is, as Dr Robbie Erskine from the Royal Derby Hospital says, "It's about choosing the right drug for the right patient for the right procedure."

Choice of Drug

The characteristics needed for an intrathecal local anaesthetic are: rapid onset, high success rate, predictable and short duration of block, minimal side effects, and not being reliant on additives for efficacy. These properties facilitate the efficient and effective use of spinal anaesthesia with a predictable discharge in a day surgery environment.

Until now anaesthetists have had a limited choice in local anaesthetics for day surgery. Clinicians have had to calculate lower doses of long-acting anaesthetics like bupivacaine in order to provide a shorter motor block in an attempt to ensure a swift return of the patient's mobility. Low dose bupivacaine has both a high failure rate and a variable discharge time that is not related to the dose given.[6] To improve the quality and success of spinal anaesthesia with longer-acting drugs, clinicians have resorted to adding unlicensed additives such as fentanyl and clonidine.

The addition of both additives often causes unwanted side effects; intrathecal opiates, including fentanyl, increase the risk of POUR, pruritus, post-operative nausea and vomiting (PONV) and sedation; [16 17 18 19 20 21] while the sedative effect of clonidine can preclude its use in day surgery.[22]

At a time when clinicians want to consider avoiding opioids (most particularly their side effects), it makes little sense to add opioids to the currently available short-acting agents that simply do not need enhancing by additives in the way low-dose long-acting LA does.[19]

In addition to opioid side effects, safety is paramount. Mixing and adding of drugs for intrathecal use introduces a source of error, both in drug and dose. This practice also increases the risk of a potential unsterile intrathecal injection.

Potential Choices of Local Anaesthetics for short-acting spinal anaesthesia:

- Lidocaine: suitable qualities, optimal for day surgery. Incidence of Transient Neurological Symptoms (TNS) 14% precludes its routine use for spinal anaesthesia.[23 17]
- Bupivacaine: long-acting LA. The summary of product characteristics advises bupivacaine for surgery of two to three hours with the recommended dose of 10 to 20mg, low dose bupivacaine is not recommended. Use of a lower dose (5mg) results in significant failure rates (25%); requires additives like fentanyl with increased side effects. Even 6-7.5mg will have an unpredictable duration and discharge time.[6 24] Not optimal for day surgery.
- Mepivacaine: intermediate acting LA. High levels of TNS, similar to Lidocaine, which precludes its use.[21]

- Articaine: Faster onset and a shorter duration of blockade compared with bupivacaine and lidocaine. Greater incidence of hypotension, bradycardia and nausea. 'Unpredictable block'[25 26]
- Chloroprocaine (Ampres®): 10mg/ml solution for injection is licensed for spinal anaesthesia in adults where the planned surgical procedure should not exceed a duration of 40min. Minimal TNS.[27] Ideal for Day Case procedures.
- Prilocaine (Prilotekal®): 20mg/ml solution for injection is indicated in adults for spinal anaesthesia in short surgical procedures, typically up to 90 minutes.[4] Very low level of neurological complication, including TNS.[28]

Prilocaine and chloroprocaine have been well studied, with publications addressing their use for a wide variety of operations. These studies include comparisons with bupivacaine and lidocaine, and have looked at the optimum dosage of these local anaesthetics for each procedure.

Figure 2.1
Choice of Local Anaesthetic.
Short acting agents provide spinal anaesthesia of appropriate duration for day case surgery.

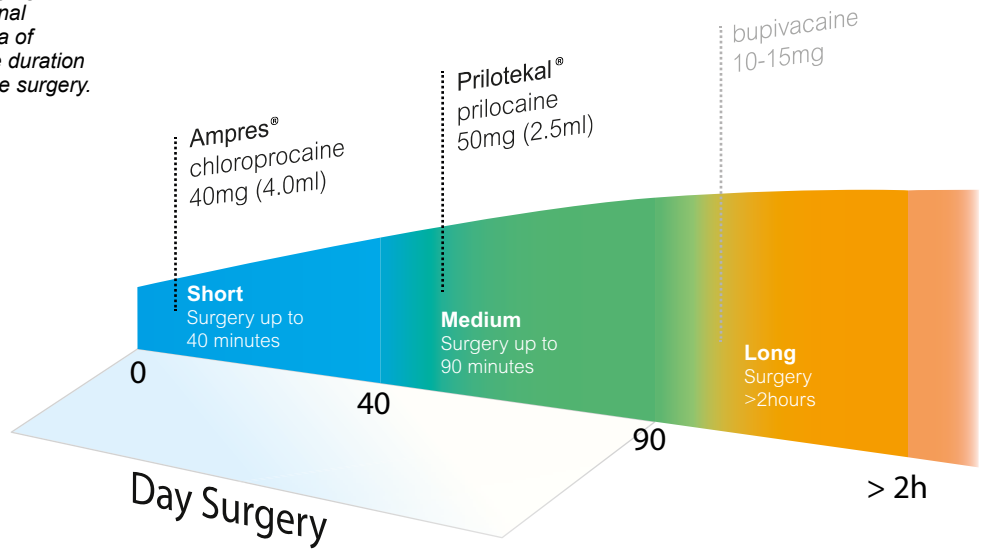


Table 2.1
Examples of day case procedures with suggested doses of short acting local anaesthetics for a developed service.

Surgery	Duration	Dose of Ampres® / Prilotekal®
Orthopaedic Surgery		
Arthroscopy of the knee +/_ meniscectomy	30-40min 60min	40mg Ampres® 50mg Prilotekal®
Autograft ACL reconstruction	40min 45-60min	40-50mg Ampres® 50mg Prilotekal®
Bunionectomy procedures	30-40min 60min	40mg Ampres® 50mg Prilotekal®
Major joint arthroplasty (THR & TKR)	90min	50-60mg Prilotekal®
General Surgery		
Excision / destruction lesion of anus / anal fissure	15-30min	30mg Ampres®
Circular stapling haemorrhoidectomy	30min	30mg Ampres®
Lateral sphincterotomy of anus	30min	40mg Ampres® 20-30mg Prilotekal® (Saddle block)
Pilonidal sinus surgery	50-60min	30mg Prilotekal® (Saddle block)
Primary inguinal hernia repair	50-60min	50-60mg Prilotekal®
Urological Surgery		
Optical urethrotomy	20-30min	40mg Ampres®
Endoscopic resection of prostate / bladder tumour	40min 60min	40-50mg Ampres® 50mg Prilotekal®
Correction of hydrocoele	40min 60min	40mg Ampres® 50-60mg Prilotekal®
Gynaecological Surgery		
Endometrial biopsy / aspiration +/- hysteroscopy	30min	40mg Ampres®
Operations to manage female incontinence	40min	40-50mg Ampres®
Colposuspension +/- Vaginal hysterectomy	60-70min	60mg Prilotekal®
Diagnostic laparoscopy	60min	60mg Prilotekal®

Choice of Drug

A United Kingdom survey of 70 day-case patients having various day-case procedures shows that the actual mean surgical duration (30.8 min) was eight minutes shorter than the anticipated mean surgical duration (39min). It also shows the actual interquartile surgical duration to be 20-40min.[29] Firstly, this shows we often overestimate the surgical duration and secondly that more than half of day-case procedures are of a duration appropriate for chloroprocaine and the majority of the rest to prilocaine. The correct utilisation of both drugs is essential, every patient, procedure and indeed surgical team requires individual consideration.

Good communication with the surgical team combined with the use of the correct drug in the correct dose for the correct procedure has contributed to the success rate of both short-acting drugs. However, part of the consent process is to always inform the patient of the possibility of a GA in the event of the spinal duration being insufficient because of surgical complications, or spinal anaesthesia failure.

Chloroprocaine and prilocaine provide a predictable duration of sensory and motor block, which makes them the only valid LAs for spinal anaesthesia for Day Surgery procedures, giving choice for patients and an alternative to GA for the anaesthetist.

The Business Case

Chapter Three

As the role of health economics increases, we cannot ignore the benefits of short-acting spinal anaesthesia. Across the globe a greater emphasis is being placed on maximising the benefits of day surgery for the patient and over stretched hospital budgets.

The use of short-acting spinal anaesthesia can increase the access to the day surgery unit (DSU), reduce post-operative side effects and improve efficiency.

Table 3.1
Breakdown of cost comparison between spinal anaesthesia and GA, with evidence from the UK and EU.

	Costs	Spinal Anaesthetic Benefits	UK	EU
Anaesthetic	Drugs, disposables. (Most transparent)	Equal or cheaper for spinal anaes. [29 9]	Variable GA dependent [33]	Spinal anaes. cheaper [29 9]
Theatre	Staff related	↓Staff ↑Turnover ↑Procedures. Costs £20/minute [30]	Spinal anaes. benefit	Spinal anaes. benefit
Recovery	Staff related	↓Labour ↑Emergence [34] ↑PACU bypass [9 35 34] ↓Side effects [34 32] and associated ↓Rx & nursing time	Spinal anaes. benefit	Spinal anaes. benefit
Hospital	Admissions. Inpatient surgery	↑DSU [27] ↓Inpatient surgery ↑Tariff for DSU ↓Outpatient visits (One Stop Surgery)	Spinal anaes. benefit	Spinal anaes. benefit
Society	Work days lost.[34] Benefits claimed	↓Outpatient visits ↓Admissions ↑DSU	Spinal anaes. benefit	Spinal anaes. benefit

Many of the costs associated with day surgery are fixed and therefore irretrievable, which means that they cannot be a central part of a decision-making process. Cost improvement can only be made by spending less on disposables and medication, reducing staff, improving efficiency or increasing the number of procedures and their associated income.[30 31 35 70]

Drugs and techniques which cause side effects and complications, prolonged stay and hospital admission, inefficiency and the poor allocation of resources rapidly erode value for money and significantly increase costs.[31]

Although the cost of drugs and disposables vary between institutions, the greatest potential for savings come through theatre efficiencies. Two European studies have shown spinal anaesthesia with chloroprocaine costs less per case than GA.[29 9] Spinal anaesthesia has a faster recovery and costs less, whilst pain occurred earlier, and more patients felt uncomfortable after GA.

Cost efficiency in theatre can be achieved by either reducing staff numbers or increasing the number of surgical cases carried out per day. With operating theatre fixed costs reported to be about £20 per minute[30], turn-around time is key. Concerns are often raised about the time taken to perform a spinal anaesthetic, which can be affected by organisational factors and staff experience. Schmittner's group showed that induction time was only three minutes longer for spinal anaesthesia compared to GA using a laryngeal mask airway (LMA).[9] Interestingly, this is the second publication to suggest a reduction in surgical time when using spinal anaesthesia.[29] This matches clinical experience, where the time from induction to surgery starting is reduced, possibly due to an awake patient and finite anaesthetic duration.

Anaesthetists who adopt a process called "parallel processing" find it is possible to reduce turn-around times by preparing the next patient on the list and thus reducing the anaesthetic time. In this way a short-acting spinal anaesthetic increases the number of cases on a list and improves efficiency.

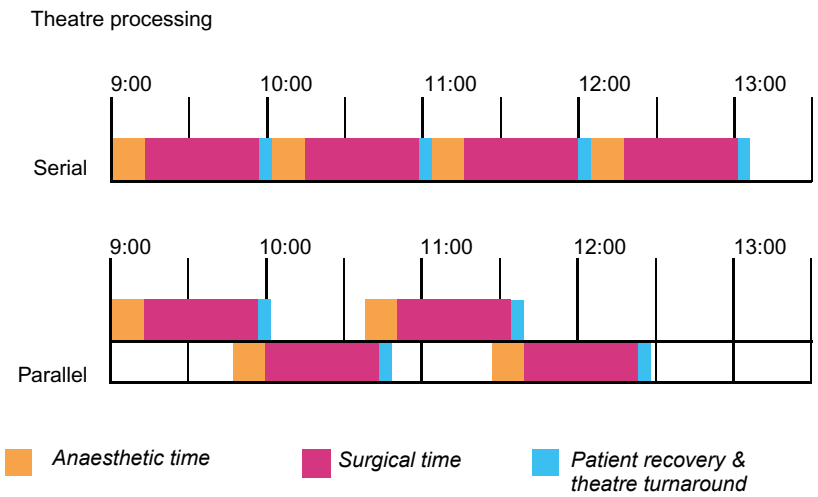


Figure 3.1
How parallel processing works.
In serial processing each case proceeds after each other.

In parallel processing anaesthesia is conducted in an anaesthetic room or block room parallel to operative and theatre turn around time.

The ultimate example of this is employed by pioneers like Admir Hadzic, director of New York Society of Regional Anesthesia, who uses the anaesthetic room or block room to perform the spinal anaesthetic outside of theatre, thus extracting the anaesthetic time from theatres and minimising theatre turn-around time.

Alternatively, with flexible working, recovery staff can come into theatre to take over care of a patient with an established, uncomplicated spinal anaesthetic before the end of surgery and escort the patient to the recovery ward. This would allow the anaesthetist time to proceed with anaesthetising the next patient, thus reducing turnaround time.

Recovery time with a short-acting spinal anaesthetic is negligible. The patient can be taken directly to the day-care ward (Phase Two Recovery) without delay; often called bypassing PACU (Post Anaesthetic Care Unit, or Phase One Recovery). Studies show 100% of patients can bypass PACU resulting in a huge reduction of 1:1 nursing care and thus expense.[29 69 31] With shorter post-operative recovery times and reduced side effects more patients can be treated by fewer staff.

UK experience in a mixed cohort of procedures (mainly knee arthroscopies), using 40mg chloroprocaine, showed similar discharge times compared to GA with desflurane, 6 minutes faster than TIVA, and 15 minutes quicker than GA with sevoflurane.[33] The European experience is more impressive. Schmittner's group found discharge times with spinal anaesthesia using chloroprocaine 25 minutes faster than short-acting opioids/propofol/LMA GA.[9] Camponovo's study[29] showed a 123 minutes faster discharge was achieved using chloroprocaine spinal anaesthesia.

The high cost to hospitals of inpatient surgery is driving the shift to day surgery. Short-acting spinal anaesthesia can increase access to DSU for those previously thought unsuitable due to their comorbidities.[27] Short-acting spinal anaesthesia also reduces post-anaesthetic side effects like PONV, slow recovery or poor immediate pain control; these complications can result in expensive unplanned admission.[34]

"With new procedures come new ways of working."
[Dr Ben Fox]

A knee arthroscopy under short-acting spinal anaesthesia gives the unsedated patient an opportunity to engage with their procedure and discuss their care with the surgeon during the operation, this can mitigate a follow-up outpatient visit and its associated costs. With an estimated 150,000 knee arthroscopies performed per year across the NHS this can translate into a significant socio-economic benefit.

"Inpatient procedures or unnecessary outpatient follow-ups increase the burden on society."
[Dr Ben Fox]

Patient Choice

Chapter Four

Patient choice is an integral part of any healthcare system. The UK's NHS promotes patient choice, giving patients the right to choose their treatment and where that treatment takes place.

The NHS online service - NHS Choices - offers patients more and more options to enable them to make better choices about their personal healthcare. However, having the right choices explained by a clinician is perhaps the primary tool for building trust and providing reassurance about the best possible healthcare outcome.

Providing pre-operative information and giving choice creates a culture of trust and greater patient satisfaction, possibly leading to improved future Patient Reported Outcome Measures (PROMs).

In the UK, the General Medical Council (GMC) states that patients should be given a choice of treatments and the legal and medical rights of patients are clearly laid out in the GMC guidance on the consent process, Consent: Patients and Doctors Making Decisions Together (2008).[37] These principles were enshrined in law by the supreme court in their verdict on the Montgomery vs Lanarkshire Health Board case.[38]

Patient choice must be based on the provision of all relevant information and doctors must ensure patients are aware of any "material risks" involved in a proposed treatment and of reasonable alternatives to that treatment.[41 37]

In deciding between short-acting spinal anaesthesia and GA patients are often simply told:

General anaesthesia = "You will be asleep."[15]

Spinal anaesthesia = "You will be awake."[40]

This is an oversimplification. Anaesthesia, especially regional anaesthesia, is a continuum of care. With short-acting spinal anaesthesia the patient could be fully awake, awake and provided with anxiolysis, lightly sedated or even have deep sedation, depending upon their personal choice.

Providing patient choice is the essence of consent.

The GMC states that 'Consent is working with patients, sharing the information they need with them, so they can make a decision about their care.'

The anaesthetist who understands the benefits and risks of a technique to all patients, especially patients with comorbidities such as obesity, diabetes or COPD or who are frail or elderly can help the patient understand the choices open to them and help them make a choice appropriate to their circumstances. Only then can true shared decision-making take place.

The Royal College of Anaesthetists states that 'Your anaesthetist will help you (the patient) choose what is best for you.'

How often do clinicians get the chance to guide that choice and to speak to the patient before the day of surgery?

The reality is that anaesthetists seldom do. The surgeon is often the first contact to give information regarding the anaesthetic. It is imperative we ensure that the correct information is made available to patients at this stage. Patients may be seen in an anaesthetic pre-assessment clinic, but as most are fit and well many will rely on acquiring information while at home.

Written patient information (made digitally accessible) can help support GP's, surgeons, nursing staff and patients at home preoperatively. This can give the patient more time to digest and understand what each procedure will involve and what they can expect before, during and after surgery.[42] The patient's decision could then be reviewed by the lead anaesthetist on the day of surgery.

When women in labour were offered a choice, and clinicians informed them of the benefits of spinal anaesthesia versus GA, spinal anaesthesia became the natural choice for caesarean sections.[43] When major hand surgery centres realised the quality, safety, efficiency and benefits of regional anaesthesia, patients chose regional anaesthesia instead of GA. These cultural changes can also occur in day surgery when the true benefits of short-acting spinal anaesthesia to patients, clinicians and hospitals are fully understood.

As more centres choose short-acting spinal anaesthesia for Day Surgery, patients will become more comfortable with spinal anaesthesia as a natural choice. For some, being able to watch the surgery and speak to the surgeon during the procedure is part of the therapeutic process, particularly with operations like knee arthroscopy during which they can engage with their treatment and understand what it will mean to them and their recovery.

Patients have the right to choose, but in many cases that choice has been limited by the lack of usage and expertise in short-acting spinal anaesthetics. Now, rather than general anaesthesia as a default, patients can actually make an informed choice, and this choice may be short-acting spinal anaesthesia.

Benefits to Patients

Chapter Five

Anaesthetists who use short-acting spinal anaesthesia are passionate about the positive effects it has for their patients and the positive feedback they receive from these patients reinforces the practice of using the technique.

Trainees are now taught about best practice in the use of drugs, techniques and correlated procedures, and are enthusiastic to learn of ways to improve patient care.

With increased publications and the increased understanding of the benefits, short-acting spinal anaesthesia is tipping the balance away from GA in favour of short-acting spinal anaesthesia in day surgery.[9 10]

Short-acting spinal anaesthetics benefit patients by:

- Giving patients a choice.
- Improving patient satisfaction.[10 34 44]
- Better immediate pain control and post-operative pain management.[40 34 3]
- Reduced PONV.[44 40 34]

  (Spinal anaesthesia associated PONV is usually caused by either intrathecal opiates, hypotension, or sympathetic blockade resulting in a vagally mediated overactivity of the gastrointestinal system.[44])
- Reduced post-discharge nausea and vomiting (PDNV); essential for the journey home.[31 44 69]
- Early hydration and nutrition, which meets ERAS targets and is particularly important in diabetic patients.[40]
- Quicker home discharge than modern GA.[9]
- Being able to talk to the surgeon and clinician, discussing their care and mitigating a follow-up outpatient visit and possibly further time off work.
- Avoiding prolonged drowsiness, and slow recovery.[34 44]
- Less risk of becoming confused post-operatively, especially in the elderly.[34]
- Opiate free anaesthesia.[34]
- Avoiding the risks of GA.[44]
- Reduced ICU admissions.[44]

Patients with comorbidities previously excluded from day surgery can now access the benefits of day surgery with short-acting spinal anaesthesia.

Benefits to Patients

Pulmonary:

Spinal anaesthesia reduces pulmonary complications compared with GA and is thus the technique of choice for patients with respiratory comorbidities.[44 48 40]

Obesity:

Spinal anaesthesia avoids the airway risk in obese patients, especially in those patients with obstructive sleep apnoea.[49 44 31]

Diabetes:

With less PONV and an earlier return to oral hydration and nutrition the patient can return earlier, and with less complication, to their previous diabetic regime.[34 40]

Cardiac:

Equal or fewer cardiovascular events occur using spinal anaesthesia alone compared with GA.[44 71 72 73] Although hypotension is a very common and bradycardia a common side effect following spinal anaesthesia, these occur with equal or lower frequency compared with GA. The short-acting agents may prove to be even more cardio-vascularly stable with a recent study showing no hypotension and no bradycardia events when using prilocaine.[64]

CVA:

Evidence suggests spinal anaesthesia may reduce cerebral vascular complications in orthopaedic surgery.[44]

The general move across the UK and Europe has been to significantly increase the number of day case procedures performed. In centres where there is a culture of using short-acting spinal anaesthesia, more patients are requesting this technique and realising the benefits it offers.

This is particularly relevant to the increasingly elderly and obese population where there are major risks from GA. The use of a short-acting spinal anaesthesia may attenuate these risks.

Chapter Six

"Spinal anaesthetic is generally regarded as one of the most reliable of regional block methods; the needle insertion technique is relatively straightforward, with cerebral spinal fluid (CSF) providing both a clear indication of successful needle placement and a medium through which local anaesthetic solution usually spreads readily."

[Fettes 2009] [9]

The commonest questions asked regarding short-acting spinal anaesthesia are: what drug, what dose, for what duration?

The following flow diagram is used in Royal Derby Hospital to assist in answering these questions and making an informed choice.

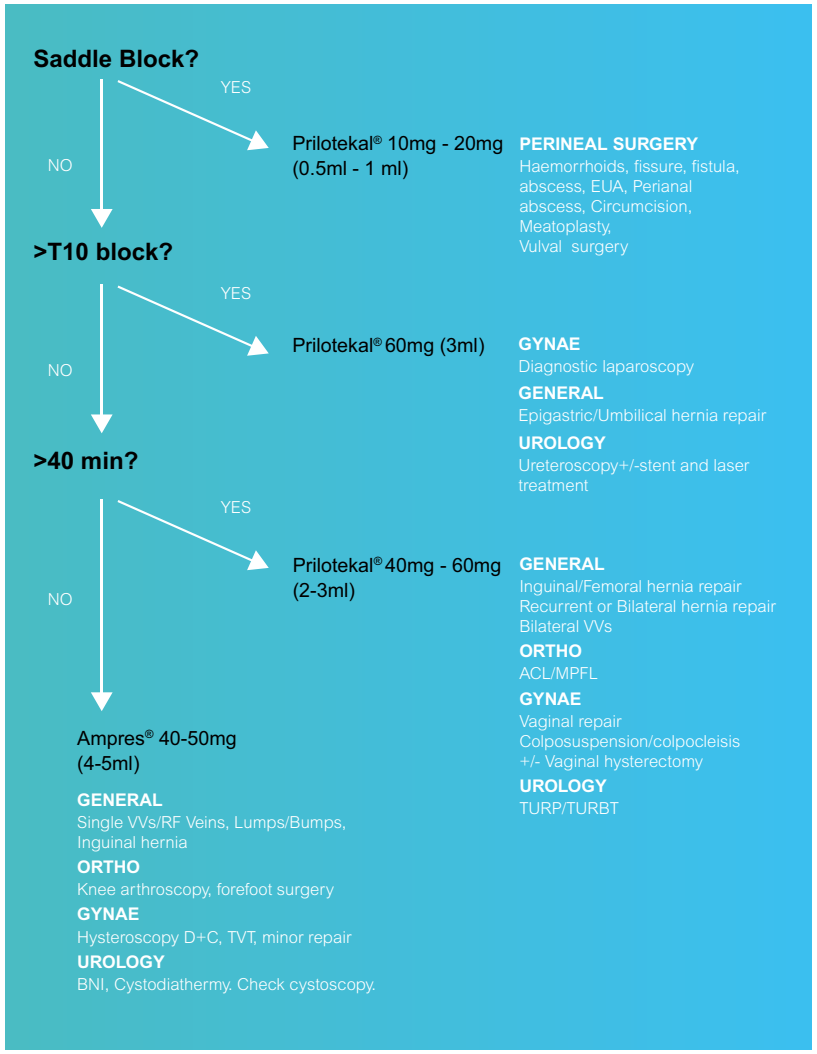


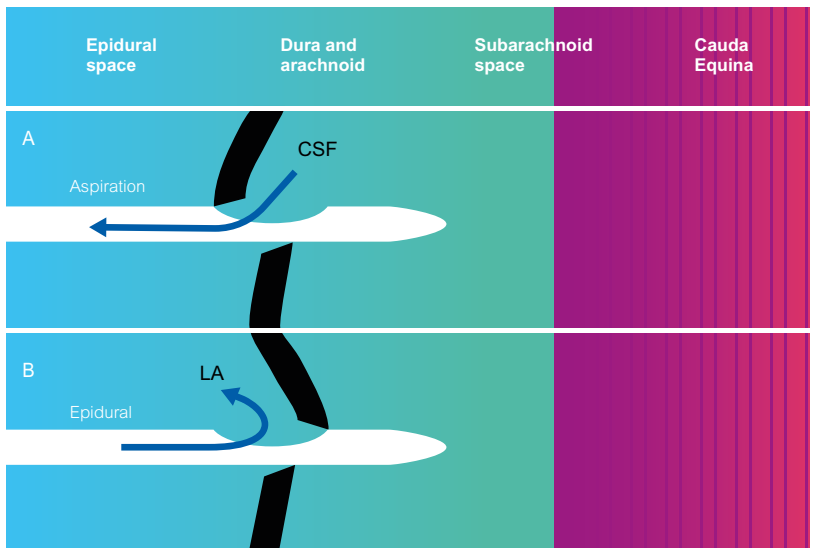
Figure 6.1
Prescribing guide for targeted Spinal Anaesthesia.

As a guide when developing a service; use 40mg chloroprocaine for day cases of surgical duration <40 minutes below L1 dermatome, whereas cases of longer duration, but <90 minutes, or those needing an abdominal wall relaxation, 50mg prilocaine is better suited.[52]

Royal Derby Hospital Spinal Anaesthetic Technique

- Ensure the scrub and surgical team are ready before starting.
- Consider the use of anxiolytic dose of midazolam before the spinal to reduce anxiety and vasovagal episodes – particularly in young men.
- Position: Sit the patient with their knees over the edge of the bed. Raise the knees on a stool. Ask them to hold a pillow and pull it into their abdomen while rounding their shoulders and head. They should arch their back like an "angry cat" (Figure 6.4). Alternatively, they can sit forward on the trolley with their legs outstretched.
- Use a 27G, or even better a 30G, hypodermic needle to inject lidocaine to the skin. Introduce the needle slowly in a single plane and inject slowly. Give it time to work.
- Anatomy varies, so develop different techniques. Use ultrasound, a paramedian approach, or the L5/S1. (the biggest paramedian interspace).
- Use the smallest gauge atraumatic spinal needle you feel comfortable with. 25 or 26 G are often used, and 27G can be less painful. The use of introducers is preferable.
- Rotate the spinal needle through 360 degrees, this may help ensure the eye of the needle is fully within the CSF, and there is no dural flap. Free flowing aspirate is critical. You may need to advance the needle slightly if the flow is hesitant.

Figure 6.2
Graphic demostration of how the dura and arachnoid mater may act as 'flap' valve across the opening of a pencil point needle. During Aspiration (A) the dura/arachnoid are pulled back allowing the flow of CSF into the needle. During injection (B) the dura/arachnoid is pushed foward and the local anaesthetic enters the epidural space.



- Inject slowly, approximately 1ml/second.
- Return flow of CSF on syringe disconnection confirms needle placement and full delivery of local anaesthetic intrathecally.
- Return the introducing stylet of the spinal needle before withdrawal. This may reduce the incidence of postdural puncture headache (PDPH).[53]
- Lie the patient down supine immediately. Leaving patients in the sitting position for a prolonged period may influence the success rate.
- Start the theatre stopwatch. In this way you will know when to assess the block and the entire team is aware of the remaining block time.
- Patient should always be consented and prepared for the possibility of block failure. The incidence varies in the literature, but a figure of 1% is often quoted.[54]
- It is clear that with a good clinical technique, experience and a meticulous approach, failure is uncommon. It is most often a problem with technique, not the local anaesthetic which results in failure.[54]

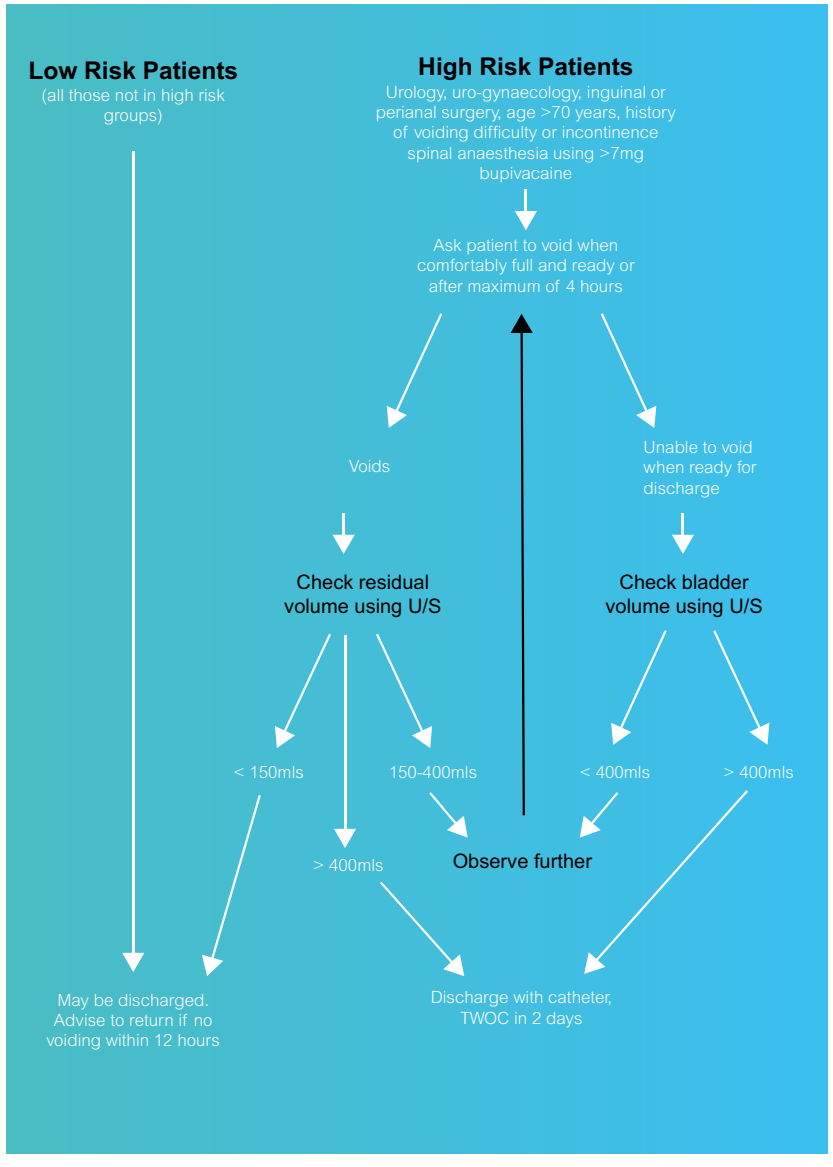
"A meticulous and fastidious technique reduces failure and complication."
[Fettes][9]

- Hypotension: Use caution sitting patients up after the procedure as a residual sympathetic block may result in significant hypotension. Bradycardia and hypotension can occur even in young and fit patients: raise their legs and administer ephedrine or glycopyrrolate.
- Hydration: ensure euvolaemia. Over hydration can extend the bladder causing urinary retention.
- Provide written information and a contact point on discharge.

Bladder management:

Modern practice requires only patients at risk of POUR to pass urine before discharge.[27 9]

Figure 6.3
Example of a bladder management flowchart, *in use at the Queen Elizabeth Hospital, Kings Lynn since 2007.*
We recommend that any similar guidance is approved by local surgeons (particulary urologist) before implementation.
Results of ultrasound scans need to be interpreted according to the individual patient and clinical circumstances.



Unilateral spinal anaesthesia:

- Increases patient satisfaction due to reduced numbness on the non-operative side.
- Patients pass urine 30 minutes earlier, when heavy prilocaine is used.[55]
- Can use lower dose LA in the spinal.[6]
- Lower incidence of hypotension.[51]
- Potential risk of error with wrong-sided block.
- However, increased anaesthetic time as patients need to remain on their side for 10-15 minutes.[6 55 74]
- Wrong side block error is introduced.

Figure 6.4
The patient should be invited to sit down on the bed with their feet on a stool, and their back arched like an "angry cat".

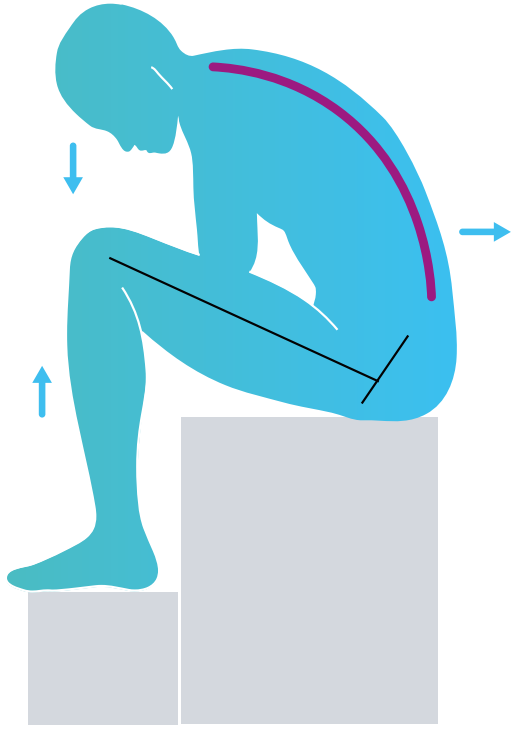
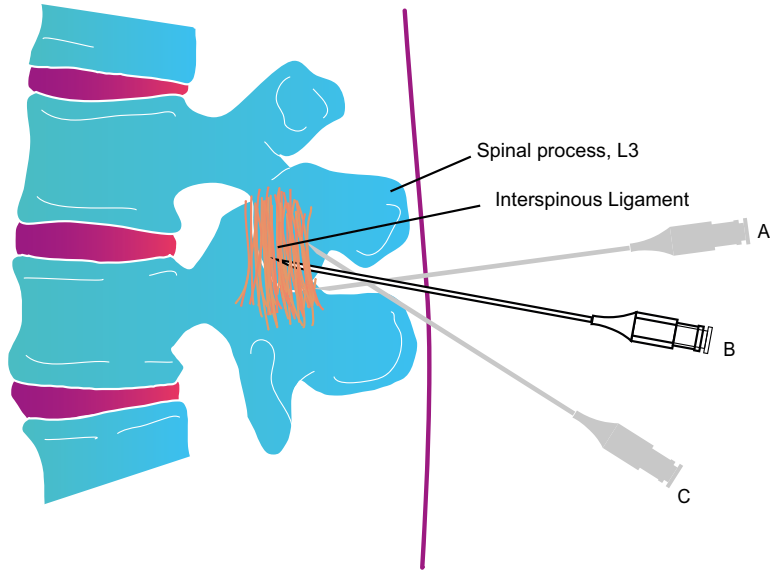


Figure 6.5
The spinal needle is inserted with a slight cephalad angulation and should advance in the midline without contacting bone (B). If bone is contacted, it may be either the caudad (A) or the cephalad spinous process (C).
The needle should be redirected slightly with cephalad and reinserted. If bone is encountered at a shallower depth, the needle is likely walking up the cephalad spinous process. If bone is encountered at a deeper depth, the needle is likely walking down the inferior spinous process. If bone is repeatedly contacted at the same depth, the needle is likely off the midline and walking along the lamina.



It is often fear of the unknown that unsettles patients. Avoid negative language (comments like, "a little bee sting", "sorry for attacking you from all sides"). Talk about something which will distract the patient.[56] Reassure your patient that you are there solely to look after them and you will take care of them.

"Anaesthetist led best practice delivers better patient outcomes."

[Dr Robbie Erskine, Consultant Anaesthetist]

Chapter Seven

No surgical procedure is without risk but putting those risks into perspective is the only way to support real patient choice and shared decision making. The following matrix contrasts the relative risks involved in spinal anaesthesia against those of GA; it becomes apparent that the risks of spinal anaesthesia are often overstated whilst those of GA understated.

Table 7.1
Risks Associated with Spinal Anaesthesia.

	At least one person in a family	At least one person in a village	At least one person in a town	At least one person in a city
Transient				
Minor		Temporary numbness or weakness		
Moderate		Headache Incomplete numbness		
Significant			Prolonged weakness or numbess Severe reaction to anaesthetic medicines	
Permanent				Spinal acord injury Death

Risk Rating

Low *Medium* *High*

Reproduced with permission from Dr Ben Fox (BSc MBBS FRCA EDRA) Consultant anaesthetist at Kings Lynn Hospital.

With Prilotekal® (prilocaine) and Ampres® (chloroprocaine) entering the UK market in 2010 and 2013 respectfully (and the EU earlier) the knowledge base is already extensive. There is good evidence comparing their activity to the more established local anaesthetics and there is extensive evidence of their clinical applications and benefits.

Table 7.2
Risks Associated with General Anaesthesia.

	At least one person in a family	At least one person in a village	At least one person in a town	At least one person in a city
Transient	Sore throat Nausea & vomiting Shivering			
Minor		Cut or bruise to lips and/ or tongue Temporary numbness or weakness		
Moderate				
Significant		Chest infection	Prolonged weakness or numbness Damage to eye or teeth. Awareness under general anaesthesia Severe reaction to anaesthetic medicines	
Permanent				Spinal cord injury Death

Risk Rating

Low *Medium* *High*

Reproduced with permission from Dr Ben Fox (BSc MBBS FRCA EDRA) Consultant anaesthetist at Kings Lynn Hospital.

Common myths and misconceptions.

"Patients won't mobilise, and we won't be able to send them home."

Two European studies and one British study show that this is not the case. In fact patients can be discharged more quickly than after a GA.[9 29 33]

"Patients will get urinary retention."

Patients with a low POUR risk are less likely to suffer from POUR after a short-acting spinal anaesthetic than after a GA.[8 29]

There have been no recorded cases of POUR associated with chloroprocaine spinal anaesthesia.[8] Urinary retention is unlikely to occur when 50mg prilocaine is not exceeded, the patient is not over-hydrated, and they are low risk of POUR. [27 57 58.]

"Spinals take too long."

Schmittner's group found the difference between GA and spinal anaesthesia induction time was no more than three minutes.[9] It can be argued that difficult cases and trainees may take longer to perform spinal anaesthesia. A simple solution is to perform spinal anaesthesia in the anaesthetic room or block room prior to surgery, thus extracting anaesthetic time completely.

Modern anaesthetic practice with appropriate and efficient processes carried out by a trained DSU team dispels this myth; anaesthetists can have the patient ready for surgery quickly and efficiently.

"The local anaesthetic didn't work."

Although spinal anaesthesia can fail, it is more likely to be the result of other factors rather than the local anaesthetic itself. e.g. a flawed technique.

"The chemical stability of drugs and modern standards of pharmaceutical manufacture mean that drug inactivity is a most unlikely cause of a failed spinal anaesthetic, but it remains a possibility which at least has to be eliminated."[54]

"Postdural puncture headache is a serious concern."

PDHP should be discussed and explained with patients during the consent process. PDPH should be treated seriously, but the majority (80%) resolve spontaneously within a week. Non-obstetric patients with atraumatic needles, 25G or smaller have a <0.5% incidence of PDPH. Those requiring a blood patch have a 75% first treatment and second treatment success rate.[53]

"Patients are scared of getting paralysed."

Interestingly patients' biggest fears are waking up during surgery and not waking up afterwards,[60] both unique to GA. During the explanation of the technique, reassure the patient the needle is introduced below the spinal cord (conus medullaris) at the level of the horse's tail (cauda equina). It often helps to refer to the spinal technique as an "epidural" as this has more positive connotations and is less scary for the patient.[60]

Dispelling the Myths

An analysis of the NAP3[61] shows the risk of permanent nerve damage after spinal anaesthesia to be no more than 1 in 160,000. The Royal College of Anaesthetists lists the risk of permanent spinal cord damage under a GA as 1 in 50,000. Anaesthetists can reassure their patients with confidence that the risk of paralysis after spinal anaesthesia is no greater than after GA.

"Patients want to be asleep."

This is neither the anaesthetist's nor the surgeon's choice. We should be careful not to transfer our preferences onto the patient. Given the choice, many patients choose to be awake, and are fearful of GA. Surveys show 30-50% of patients would prefer regional anaesthesia.[60]

Most patients do not draw the distinction between a "drug-induced coma" and being "asleep". They are not asking for a GA, but rather assurance that they will be safe and pain-free. Over 80% of patients decline sedation once they are draped and the adequacy of the spinal anaesthesia has been demonstrated.[60]

"Local anaesthetics are neurotoxic and cause TNS."

LAs are all neurotoxic: bupivacaine>prilocaine>chloroprocaine.[25] Toxicity does not necessarily relate to the incidence of TNS.

Incidence of TNS:

Chloroprocaine 0.6% (upper limit of confidence level range) [47 25 62] Bupivacaine 1.1%, Prilocaine 1.7% Lidocaine 17%, Mepivacaine 19%.

It should be remembered that the lithotomy position itself can cause TNS 1.5%[4].

"Adding opioids to a spinal is essential."

The practice of adding fentanyl or sufentanil is neither licensed nor necessary: they add risk and side effects when both chloroprocaine and prilocaine are effective without additives.

Many clinicians add opioids to provide post-operative analgesia. In the vast majority of day surgery cases this is simply unnecessary and a non-opioid multimodal approach including other forms of Regional Anaesthesia (RA) and LA infiltration should be preferred.

The increased risk, although admittedly small, of PONV, POUR, and pruritus can jeopardise prompt discharge and make intrathecal opioids inappropriate in day case surgery.

"Spinal anaesthesia causes backache."

Backache occurs after all types of anaesthesia, including GA.[34] The association with back pain is the duration of surgery and not the anaesthetic technique. Patients may experience local tenderness, but not chronic back pain. Patients can be reassured by the practice of epidural injection being used to treat chronic back pain.

"Giving a quick GA is easier, simpler and better for the patient."

Anaesthetists who regularly perform spinal anaesthesia and are proficient in the technique find it as quick and easy with less complications and side effects. However, as the Schmittner group demonstrated, induction only takes a few minutes longer on average for a spinal anaesthetic.[9]

Dispelling the Myths

Demonstrated higher patient satisfaction, better immediate pain relief, less PONV, and many other benefits over GA speak against this outdated attitude.

It should be remembered that it is the patient's fully informed choice and not the clinician's preference that should be considered.

"Spinal anaesthesia patients cannot be allowed to go home without passing urine."

Current day case practice supports discharge without passing urine in most patients.[27 9 63]

The short-acting LAs have significantly reduced the risk of POUR.

"Spinal anaesthesia patients have more chance of hypotension and bradycardia."

Although hypotension is a very common and bradycardia a common side effect with spinal anaesthesia, these occur with equal or lower frequency compared with GA.[44 71 72 73] Short-acting spinal anaesthesia, unilateral and saddle blocks may reduce the haemodynamic impact of spinal anaesthesia.[51 63] A recent study showed no hypotension and no bradycardia events when using prilocaine.[64] General advice regarding spinal anaesthesia still stands; euvolaemia should be maintained and the patients should not be sat-up quickly. Conversely intra-operative hypertension under GA due to intubation or pain may be more common and more harmful to patients.

There are risks with all procedures and the good practitioner must know these in order to provide informed consent and recognise early signs of complications. It is also a duty of care to balance the risks of spinal anaesthesia against the risks and limited benefits of a general anaesthetic.

"We, as a profession, have not done a very good job in educating the public about issues pertaining to regional anaesthesia. Further education of the public" and the profession "could possibly be addressed through the use of the very same media that has in the past led to increased fears about spinal anaesthesia as a technique".

[Peter Matthey][60]

The Future

Chapter Eight

As anaesthetists continue to explore the benefits of reliable short-acting spinal anaesthesia they will extend the potential of the technique.

Many centres are already carrying out knee arthroscopy under short acting spinal anaesthesia in order to engage the patient, informing them of their diagnosis during the procedure and avoiding unnecessary follow-up visits. The potential opportunities of this approach are likely to quickly overshadow outdated practices and become the standard of care.

Already many centres are exploring the potential of short-acting spinal anaesthesia as part of a major joint arthroplasty enhanced recovery programme moving towards day case procedures because of its benefits;

- Improved PROMs.
- Earlier mobilisation; meeting ERAS targets.
- Reduced risk of POUR; avoiding catheterisation, potential infection risk, over-flow incontinence and wasted nursing time.
- Shorter sympathetic block duration; reduced duration and risk of hypotension on the ward.
- Immediate 1:1 pain control in recovery with early sensation resolution, avoiding delays in pain management that often occurs on a busy ward.

In Obstetrics short-acting spinal anaesthesia is proving its value in post-delivery mothers who need to go to theatre for removal of retained products of conception or perineal repairs but want to return immediately, clear-headed, to care for their child.

Caesarean sections are being performed using the shorter-acting spinal anaesthetics, enabling ERAS and facilitating the bond between mother and child.

Procedures such as Trans-abdominal Preperitoneal (TAPP), Total Extraperitoneal (TEP) inguinal hernia repair and laparoscopic cholecystectomy are being performed under spinal anaesthesia and benefit from better immediate pain control, reduced PONV, and have a greater day case potential.[32 65 66 67 75 76 77 78.]

Spinal anaesthesia is the predominant technique in obstetrics, orthopaedics, and urology with a proven track record. There is no reason why that should not be the case in day surgical procedures too.

"Once we start accepting the benefits of short-acting spinal anaesthesia and offering informed choice to our patients, it will become the norm for day surgery and provide greater efficiency and satisfaction in our hospitals."

[Dr Oliver Tweedie]

References

1. Appleby J. Day case surgery: a good news story for the NHS. BMJ 2015; 351: 1-4.

2. Enhanced recovery care pathway. A better journey for patients seven days a week and better deal for the NHS. NHS Improving Quality in collaboration with NHS England. www.nhsiq.nhs.uk Nov 2013.

3. Whiteside JB, Wildsmith JAW. Spinal anaesthesia: an update. Continuing Education in Anaesthesia Critical Care & Pain 2005; 5(2): 37-40.

4. Manaserro A, Fanelli A. Prilocaine hydrochloride 2% hyperbaric solution for intrathecal injection: a clinical review. Local Reg Anesth 2017; 10: 15-24.

5. Liu SS, Ware PD, Allen HW, Neal JM, Pollock JE. Dose-response characteristics of spinal bupivacaine in volunteers. Clinical implications for ambulatory anesthesia. Anesthesiology 1996; 85(4): 729-36.

6. Nair GS, Abrishami A, Lermitte J, Chung F. Systematic review of spinal anaesthesia using bupivacaine for ambulatory knee arthroscopy. Br J Anaesth 2009; 102(3): 307-15. 7. General Medical Council – Good Medical Practice. 22 April 2013 www.gmc-uk.org/guidance.

8. Forster JG. Short-acting spinal anesthesia in the ambulatory setting. Curr Opin Anaesthiol 2014; 27(6): 597-604.

9. Gebhardt V, Zawierucha V, Schöffski O, Schwarz A, Weiss C, Schmittner MD. Spinal anaesthesia with chloroprocaine 1% versus total intravenous anaesthesia for outpatient knee arthroscopy. Eur J Anaesthesiol 2018, 35(10): 774-781.

10. Teunkens A, et al. Measuring satisfaction and anesthesia related outcomes in a surgical day care centre: A three year single-centre observational study. J Clin Anesth 2017; 43: 15-23.

11. American Society of Anesthesiologists Task Force on Acute Pain Management: Practice guidelines for acute pain management in the perioperative setting: An updated report by the American Society of Anesthesiologists Task Force on Acute Pain Management. Anesthesiology 2012; 116: 248-73.

12. Bardram L, Funch-Jensen P, Jensen P, Crawford ME, Kehlet H. Recovery after laparoscopic colonic surgery with epidural analgesia and early oral nutrition and mobilisation. Lancet 1995; 345: 763-4.

13. Kehlet H. Multimodal approach to control postoperative pathophysiology and rehabilitation. Br J Anaesth 1997; 78: 606-617.

14. Schmittner M.D., Gebhardt V. New short-acting local anaesthetics for spinal anaesthesia – well-tried substances for ambulatory surgery Anästhesiol Intensivmed Notfallmed Schmerzther 2015; 50: 166-173.

15. Anaesthetic choices for hip or knee replacement. Information for patients. The Royal College of Anaesthetists (RCoA) & Association of Anaesthetists of Great Britain and Ireland (AAGBI). 4th Edition 2014.

16. Vath JS and Kopacz DJ. Spinal 2-chloroprocaine: the effect of added fentanyl. Anesth Analg 2004; 98: 89-94.

17. Ben-David B, Solomon E, Levin H, Admoni H, Goldik Z. Intrathecal fentanyl with small-dose dilute bupivacaine: better anesthesia without prolonging recovery. Anesth Analg 1997; 85(3): 560-5.

18. Gupta A, Axelsson K, Thörn SE, Matthiessen P, Larsson LG, Holmström B, Wattwil. Low-dose bupivacaine plus fentanyl for spinal anaesthesia during inguinal herniorrhaphy: a comparison between 6mg and 7.5mg bupivacaine. Acta Anaesthesiol Scand 2003; 47: 13-19.

19. Hindle A. Intrathecal opioids in the management of acute postoperative pain. Continuing Education in Anaesthesia Critical Care & Pain 2008; 8(3): 81-85.

20. Wong J, Marshall S, Chung F, Sinclair D, Song D, Tong D. Spinal anaesthesia improves the early recovery profile of patients undergoing ambulatory knee arthroscopy. Can J Anesth 2001; 48(4); 369-374.

21. Korhonen AM, Valanne JV, Ritva M, Jokela RM, Ravaska P, Korttila KT. A comparison of selective spinal anesthesia with hyperbaric bupivacaine and general anesthesia with desflurane for outpatient knee arthroscopy. Anesth Analg 2004; 99: 1668-73.

22. Gecaj-Gashi A, Terziqi H, Pervorfi T, Kryeziu A. Intrathecal clonidine added to small-dose bupivacaine prolongs postoperative analgesia in patients undergoing transurethral surgery. Can Urol Assoc J 2012; 6(1): 25–29.

23. Zaric D, Pace NL. Transient neurologic symptoms after spinal anaesthesia with lidocaine versus other local anaesthetics: A systematic review of randomised, controlled trials. Anesth Analg 2005; 100: 1811-6.

24. Ben-David B, Levin H, Solomon E, Admoni H, Vaida S. Spinal bupivacaine in ambulatory surgery: the effect of saline dilution. Anesth Analg 1996; 83(4): 716-20.

25. Kallio H, Snäll E.-V.T, Luode T, Rosenberg P.H. Hyperbaric articaine for day-case spinal anaesthesia. Br J Anaesth 2006; 97 (5): 704–9.

26. Wulf H, Hampl K, Steinfeldt T. Speed spinal anesthesia revisited: new drugs and their clinical effects. Curr Opin Anesthesiol 2013: 26(5); 613-620.

27. Goldblum E, Atchabahian A. The use of 2-chloroprocaine for spinal anaesthesia. Acta Anaesthesiol Scand 2013 May; 57(5): 545-52.

28. W. König, Ruzicic D. Absence of transient radicular irritation after 5000 spinal anaesthetics with prilocaine. Anaesthesia 1997; 52(2): 182-3.

29. Sriraman R, Hormis A, Russon K. Intrathecal hyperbaric 2% prilocaine for day surgery: a prospective, observational study. The Journal of One-Day Surgery 2015; 25(2): 51-54.

30. Evaluation of the productive operating theatre programme. NHS Institution for Innovation and Improvement. 2013 Jan.

31. Fosnot CD, Fleisher LA, Keogh J. Providing value in ambulatory anesthesia. Curr Opin Anesthesiol 2015; 28; 617-622.

References

32. Dexter F, Macario A, Manberg PJ, Lubarsky DA. Computer simulation to determine how rapid anesthetic recovery protocols to decrease the time for emergence or increase the phase I postanesthesia care unit bypass rate affect staffing of an ambulatory surgery center. Anesth Analg 1999; 88(5): 1053-63.

33. Fletcher D, Edwards D, Tolchard S, Baker R, Berstock J. Improving theatre turnaround time. BMJ Quality Improvement Reports 2017; 6: 1-5.

34.Camponovo C. Spinal 1% 2-chloroprocaine versus general anesthesia for ultra-short outpatient procedures: a retrospective analysis. Acta Biomed 2014; 85: 265-268.

35. La Malfa M, Erskine R. Is spinal 1% chloroprocaine more cost effective than GA for day case surgery? Poster Presentation British Association of Day Surgery (BADS) Torquay 2015.

36. Spinal Anaesthesia for Day Surgery Patients; A Practical Guide. A British Association of day Surgery Handbook. 2013; 3rd Edition.

37. Consent: patients and doctors making decisions together. GMC publication. 2008.

38. Judgment: Montgomery (Appellant) v Lanarkshire Health Board (Respondent) Supreme Court. March 2015.

39. Buggy DJ. Editorial I: Central neuraxial block: defining risk more clearly. Br J Anaesth 2009; 102(2): 151-3.

40. Your spinal anaesthetic. Information for patients. The Royal College of Anaesthetists (RCoA) & Association of Anaesthetists of Great Britain and Ireland (AAGBI). 4th edition 2014.

41. Risk in more detail. Royal College of Anaesthetists Patient Information leaflets. www.rcoa.ac.uk.

42. Staikou C, Paraskeva A, Karmaniolou I, Mani A, Chondrogiannis K. Current Practice in obstetric anesthesia: a 2012 European survey. Minerva Anestesiol 2014; 80: 347-54.

43. Hutton M, Brull R, Macfarlane AJR. Regional anaesthesia and outcomes. BJA Education 2018; 18(2): 52-6.

44. Hausman Jr. MS, Jewell ES, Engoren M. Regional versus general anaesthesia in surgical patients with chronic obstructive pulmonary disease: does avoiding general anaesthesia reduce the risk of postoperative complications? Anesth Analg 2015; 120 (6): 1405-12.

45. Martinez G, Faber P. Obstructive sleep apnoea. Continuing Education in Anaesthesia Critical Care & Pain 2011; 11(1): 5-8.

46. Dobson PMS, Caldicott LD, Gerrish SP, Cole JR, Channer KS. Changes in haemodynamic variables during transurethral resection of the prostate: comparison of general and spinal anaesthesia. Br J Anaesth 1994; 72: 267-71.

47. Gonano S, Leitgeb U, Sitzwohl C, Ihra G, Weinstabl C, Kettner SC. Spinal versus general anesthesia for orthopedic surgery: anesthesia drug and supply costs. Anesth Analg 2006; 102: 524-9.

48. Meng T, Zhong Z, Meng L. Impact of spinal anaesthesia vs. general anaesthesia on peri-operative outcome in lumbar spine surgery: a systematic review and meta-analysis of randomised, controlled trials. Anaesthesia 2017; 72(3): 391–401.

49. Cannata F, Costantini M, Spinoglio A, Canneti A, Luzi M, et al. Anaesthesia for Endoscopic Urological Surgery: A Comparison of 2% Hyperbaric Prilocaine with 0.5% Hyperbaric Bupivacaine. J Urol Res 2016; 3(1): 1042.

50. Guntz E, Latrech B, Tsiberidis C, Gouwy J, Kapessidou Y. ED50 and ED90 of intrathecal hyperbaric 2% prilocaine in ambulatory knee arthroscopy. Can J Anaesth 2014 Sep; 61(9):801-7.

51. Harrington BE, Reina MA. Postdural puncture headache. Based on Hadzic's textbook of RAPM 2nd Ed 2017. New York Society of Regional Anesthesia. Continuing medical education.

52. Fettes PDW, Jansson J.-R, Wildsmith JAW. Failed spinal anaesthesia: mechanisms, management, and prevention. Br J Anaesth 2009; 102(6): 739-48.

53. Manassero A, Bossolasco M, Ugues S, Bailo C, Liarou C, Coletta G. Comparison of unilateral and bilateral spinal anesthesia with 2% hyperbaric prilocaine in day-case inguinal herniorrhaphy: a randomized controlled trial. Minerva Anestesiol 2014 Jun; 80(6): 685-91.

54. Casati A, Fanelli G, et al. Frequency of hypotension during conventional or asymmetric hyperbaric spinal block. Reg Anesth Pain Med 1999; 24(3): 214-9.

55. Esmaoğlu A, Boyaci A, Ersoy O, Güler G, Talo R, Tercan E. Unilateral spinal anaesthesia with hyperbaric bupivacaine. Acta Anaesthesiol Scand 1998; 42(9): 1083-7.

56. Lang E, Laser E. Patient sedation without medication; rapid rapport and quick hypnotic techniques. Amazon publication 2009.

57. Guntz E, Kapessidou Y. Spinal prilocaine for same day surgery: the importance of equipotent doses. Can J Anesth 2016; 63(8): 985-6.

58. Kreutziger J, Frankenberger B, Luger TJ, Richard S, Zbinden S. Urinary retention after spinal anaesthesia with hyperbaric prilocaine 2% in an ambulatory setting. Br J Anaesth 2010; 104(5): 582-6.

59. Matthey PW, Finegan BA, Finucane BT. The Public's Fears About and Perceptions of Regional Anesthesia. Reg Anesth Pain Med 2004; 29(2): 96-101.

60. Cook TM, Counsell D, Wildsmith JAW. Major complications of central neuraxial block: report on the Third National Audit Project of the Royal College of Anaesthetists. Br J Anaesth 2009; 102(2): 179–190.

61. Lacasse M-A, Roy J-D, Forget J, et al. Comparison of bupivacaine and 2-chloroprocaine for spinal anesthesia for outpatient surgery: a double-blind randomised trial. Can J Anesth 2011; 58: 384-391.

References

62. Eberhart LH, Morin AM, Kranke P, Geldner G, Wulf H. Transient neurologic symptoms after spinal anesthesia. A quantitative systematic overview (meta-analysis) of randomized controlled studies. Anaesthesist 2002; 51: 539-46.

63. Gebhardt V, Mueller-Hansen L, Schwarz A, Bussen D, Weiss C, Schmittner MD. Chloroprocaine 10 mg/ml for low-dose spinal anaesthesia in perianal surgery – a randomised dose finding study. Acta Anaesthesiologica Scandinavica 2017; 61: 241-249.

64. Molinelli BM, Tagliavia A, Bernstein D. Total Extraperitoneal Preperitoneal Laparoscopic Hernia Repair Using Spinal Anesthesia. Journal of the Society of Laparoendoscopic Surgeons 2006; 10: 341-344.

65. Tiwari S, Chauhan A, Chaterjee P, Alam MT. Laparoscopic cholecystectomy under spinal anaesthesia: A prospective, randomised study. J Minim Access Surg 2013; 9(2): 65-71.

66. Sarakatsianou C, Georgopoulou S, Baloyiannis I, Chatzimichail M, Vretzakis G, Zacharoulis D, Tzovaras G. Spinal versus general anesthesia for transabdominal preperitoneal (TAPP) repair of inguinal hernia: Interim analysis of a controlled randomized trial. The American Journal of Surgery 2017; 214: 239-245.

67. Donmez T, Erdem VM, Uzman S, Yildirim D, Avaroglu H, Ferahman S, Sunamak O. Laparoscopic cholecystectomy under spinal-epidural anesthesia vs. general anaesthesia: a prospective randomised study. Ann Surg Treat Res 2017; 92(3): 136-142.

68. Imbelloni LE, Sant'Anna R, Fornasari M, Fialho JC. Laparoscopic cholecystectomy under spinal anesthesia: comparative study between conventional-dose and low-dose hyperbaric bupivacaine. Local Reg Anesth 2011; 4: 41-46.

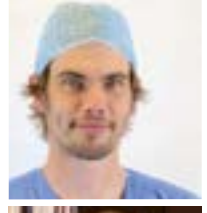
69. Tzovaras G, Fafoulakis F, Pratsas K, Georgopoulou S, Stamatiou G, Hatzitheofilou C. Spinal vs General Anesthesia for Laparoscopic Cholecystectomy. Interim Analysis of a Controlled Randomized Trial. Arch Surg 2008; 143(5): 497-501.

70. Yu G, Wen Q, Qiu L, Bo L, Yu J. Laparoscopic cholecystectomy under spinal anaesthesia vs. general anaesthesia: a meta-analysis of randomized controlled trials. BMC Anesthesiology 2015; 15: 176.

List of Contributors

Dr Robbie Erskine MBBS FRCA

Consultant Anaesthetist and acute pain specialist at the Royal Derby Teaching Hospital NHS Foundation Trust for 25 years. Special interest in regional and spinal anaesthesia for day case, orthopaedic, trauma, vascular and gynaecology. Trained at University College Hospital London with higher specialist training in the East Midlands UK. Produced guidelines for the management of day case spinal anaesthesia. Lectured on SA to scientific meetings of the British Association of Day Surgery and presented at ESRA and RAUK. Has extensive experience in the use of short acting SA for inpatient and day case surgery.



Dr Ben Fox BSc MBBS FRCA EDRA

Trained at Imperial College, London MBBS. Leads the Regional Anaesthesia Masters Degree Programme at University of East Anglia, former GAT (Group of Anaesthetists in Training) Chair of Association of Anaesthetists of Great Britain and Ireland. Author of Burnout in Anaesthetic Trainees. Consultant anaesthetist at Kings Lynn Hospital in Norfolk. Described as one of the best young prospects to lead in Regional Anaesthesia in the UK.

Dr Emmanuel Guntz MD PhD Anesthesiologist

Vice-President of BARA (Belgian Association of Regional Anesthesia). Secretary of CALR (Certificate of Regional Anesthesia) at ULB Brussels. Published author in the field of pain and regional anesthesia. Scientific Collaborator of ULB. Secretary of the faculty of specialised master in anesthesia intensive care ULB. Studied the link between NMDA receptors and remifentanil in the spinal cord as PhD. Consultant anaesthetist at L' Hôpital de Braine-l'Alleud, Belgium.

Dr Marco La Malfa

Medical Director and Consultant Anaesthetist Care UK. At Care UK he was one of the first consultants to use fast acting local anaesthetics for spinal anaesthesia within the UK producing studies presented at ESRA and ASRA. Trained in Rome. Completed training in anaesthesia and intensive care at the University Hospital of Antwerp. Special interest in day case surgery and loco-regional anaesthesia.

Professor Dr. med. Marc D. Schmittner DESA MHBA

Director of the Clinic for Anaesthesiology, Intensive Care and Pain Medicine at Unfallkrankenhaus Berlin (UKB). Specialist in Anaesthesiology, Anaesthesiological Intensive Care Medicine and Special Pain Therapy. Supplementary training: Chief Emergency Physician, Certified OP-Manager, Certificate in Special Paediatric Anaesthesia, Master of Health Business Administration (MHBA). Chairman of the Programme Commission of the subcommittee Outpatient Anaesthesia of the German Anaesthesiological Congress (DAC).

Dr James Stimpson MBChB MRCP FRCA PGCME PGCert Clin Lds

Dr James Stimpson is a Consultant Anaesthetist at the Queen Elizabeth Hospital in King's Lynn, Norfolk. He graduated from Leicester, and trained in anaesthetics in the Eastern Region, which included a regional anaesthesia fellowship with Dr Nick Denny, Dr Jon Allen and Dr Bev Watson. His interest is in anaesthetic techniques which can provide early ambulation with minimal or no pain.

Dr Oliver J Tweedie MBChB FRCA FFPMRCA

Consultant Anaesthetist and Acute Pain Service Clinical Lead since 2005 at Dorset County Hospital UK. A Regional anaesthetist with a special interest in continuous peripheral nerve blocks. Past Divisional Director of Surgical Division & Clinical Lead of Day Surgery. Member of faculty London Society of Regional Anaesthesia, USGRA Bristol, East Surrey RA course. Speaker at RAUK & AAGBI ASM, honorary lecturer University East Anglia. Medical Director Sintetica Ltd.

It gives me great pleasure to present the first publication of this handbook, ‘Spinal Anaesthesia in Day Surgery; Right Drug, Right Patient, Right Procedure’.

At Sintetica we believe in putting the needs of the patient first and promoting medical education, and I believe this handbook does just that.

This handbook is a collaborative publication combining the experience, knowledge and enthusiasm of leading specialists from across the UK and Europe. It has been compiled, edited and funded by Sintetica, with final approval being held by the contributing specialists.

I would like to thank Dr William Harrop-Griffiths, Consultant Anaesthetist at St Mary’s Hospital and an Honorary Clinical Senior Lecturer at Imperial College, London, for taking the time to write the foreword for this handbook.

We would also like to thank our contributors from across specialist centres in Europe for their expert input, professional advice and support.

Dr Oliver Tweedie,

Consultant Anaesthetist and Medical Director, Sintetica Ltd.

Sintetica Limited
30th Floor
40 Bank Street
Canary Wharf
London E14 5NR

www.sintetica.com/uk

ONE DAY SURGERY

Date of Preparation: October 2018
Job Bag Number: SINT022