Vitus Spine

VITUS SPINE NEWS

Quarterly Newsletter updates
(Formerly JISAR Newsletter)

Vol. 3 - Sept 2017
ISSUE - 21

From the Editor's desk

Dear friends

Each volume of our newsletter focusses on a specific aspect of spine surgery or therapy which is a challenge in itself.

Spinal fusion surgeries in the elderly is one such treatment modality of spinal disorders which is fraught with dangers and is a potential minefield, simply because of the co-existent medical co-morbidities like diabetes, hypertension, COPD, renal dysfunction, osteoporosis. However denying a quality of life improving surgery simply because of these challenges and potential complications is not acceptable in these times where the need to be functionally independent and lead a productive pain free life is at the highest.

Just like all medical scenarios, many measures and steps can be adapted by clinicians and surgeons to make these spinal surgeries a reasonably safe and feasible option of treatment in spinal degenerative disorders.

Prologue:

As I lowered myself into my seat in the middle row, I was looking forward to the two and a half hour journey, so that I could catch up on some sleep. As the flight was getting ready with the passengers being settled, I turned to my left towards the window seat and noticed a handsome youngman, a decade younger to me. The odd thing that struck me was he was very jittery and appeared nervous, often biting his nails and looking out of the window. I slowly started a conversation with him and poked him about his nervous state. He opened up a bit and confided that he hadn't travelled much by flight and had read a lot about the possible things that could go wrong. Having calmly reassured him about the inherent safety checks in these flights and reeling out stats about the lesser likelihood of accidents,i returned to taking a nap. As the flight was taxiing out and preparing for the take-off, the elderly gentleman on my right side in the aisle seat started chanting a small prayer. He looked like an executive in a corporate company. Pleasantly surprised,I asked him, "Is this your first time too on a flight? You look scared sir. Normally these flights have a lot of safety checks and nothing should happen" The Old man looked at me with a wry smile and said, "Son, I am one of the design engineers of these flights and have travelled umpteen number of times. I know about every possible time and place where the glitches might appear. So, I drop a prayer every take off and landing."
I smiled to myself and tried to get back to my nap, but sleep evaded me. I started thinking about the people on either side and a train of thoughts ran through my brain.

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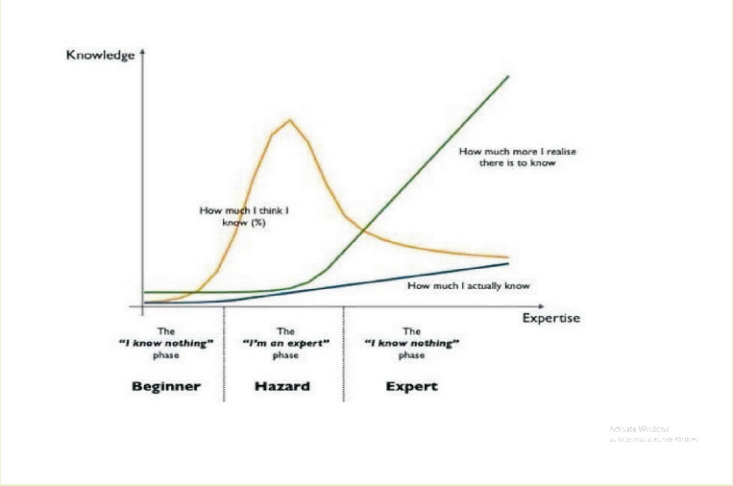
- *All flights operate with a multi-item checklist for both the flight safety and pilot fitness for the flight. The use of such checklists enhances the safety levels of air travel and the same concept has been borrowed in various other fields, including in the operating theatres.*



- *The concept of a team of equally trained spine surgeons operating together helps to increase the safety of spine surgery and also to decrease the postoperative morbidity and complication rates.*

- *A surgeon's progression in his/her career goes through phases. Initially there is a lot of emphasis on learningskills and a lot of caution is exercised at every step and great respect shown to following these steps meticulously. This is driven by an inherent fear of something going wrong. As the skill sets increase and the surgical procedure becomes common practice and a routine day to day affair with the comfort factor coming in, there is a tendency for some amount of complacency and undue courage to set in. This can lead to complications in spite of the surgeon being skilled and thinking that he knows a lot. The next transition and progress is to a phase where the surgeon completely is aware of the possible potential troublesome areas of any procedure and hence operates and does the procedure with a mixture of speed and carefulness.*

- *One such domain where focussed training has made an impact is in the realm of spinal surgeries, where a good amount of time spent in training and gaining experience has decreased the perioperative morbidity and improved outcomes, especially in spinal fusions in the elderly.*

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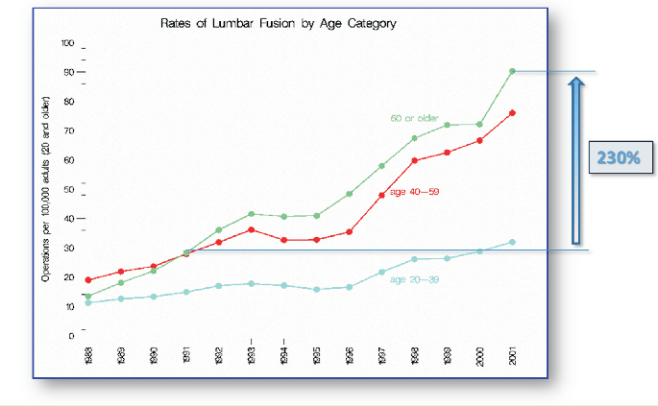
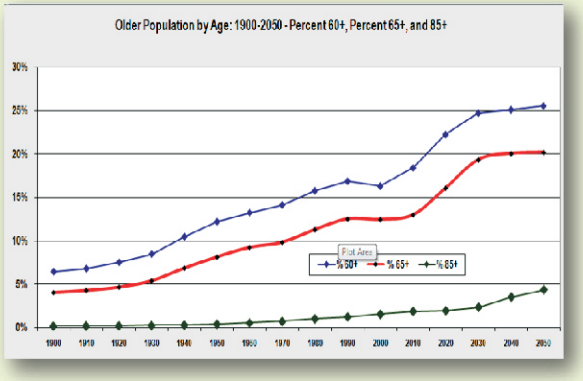
Spine Surgery in elderly: The Safety and Concerns.

The percentage of population aged 60 years and above is steadily increasing and expected to reach significantly high proportions by 2050.



There is a concomitant increase in the number of spine surgeries happening in the elderly, with a 230 percent increase.



Since the elderly patients have a number of medical and surgical co morbidities any surgical intervention is fraught with the possible complications and literature shows ample evidence on the high incidence of perioperative complications in these patients who undergo spine fusion procedures.

This makes many a clinician to nudge the patient towards avoiding the surgery, thus denying the patient a chance to improve his quality of life especially in terms of pain free mobility and an independent functionally fulfilling life.

On the other hand literature also has a lot of evidence towards the high success rates of spine fusion surgery in the elderly especially in terms of improving the functional quality of life.

This leads to us a cross road, where more often than not, objective clinical decision making is clouded by the fear of complication, which can be vicious in the said population.

In an effort to make the spinal fusion procedures safer and efficient in the elderly we identified the following key aspects, which if well taken care of, go a long way in improving the outcomes. This needs development of infrastructure in various levels like comprehensive clinical team approach, resource and skill development and adapting to novel clinical problems and situations.

Comprehensive Clinical Team Approach:

There is no substitute to a good preoperative work up of these patients. Since majority of these spinal fusion procedures are elective in nature, we can afford to optimise the patient with respect to the medical comorbidities and later subject them t the procedure. In this aspect we often have a consultation with the attending

anaesthesiologist, physician and when required a consultation with the cardiologist, endocrinologist, pulmonologist, nephrologist or a neurologist. This ensures optimisation of the patient and hence has reduced the risk of perioperative complications. Also the in house specialist has a fair idea of what to expect in the postoperative period and the entire team is geared up to the challenge.

The Anaesthesiologist has played a crucial role in the success and favourable outcomes of spinal fusion, mainly by recognising the potential perioperative medical complications. Also the infusion of tranexamic acid preoperatively and during surgery has reduced the amount of bleeding and also the need for transfusions

Pre operative tranexemic acid
A single dose tranexemic acid preoperatively 15mg/kg can effectively decrease blood loss without increasing risk of DVT

Resource and Skill Development:
Literature is abound with reports that perioperative morbidity and mortality in elderly patients undergoing spinal fusion surgery is directly proportional to the operativetime and anaesthesia time. This can be reduced if the surgery is performed by a team of two or more trained spine surgeons working in tandem, rather than a single surgeon. This also eliminates fatigue factor of a single spine surgeon

J Child Orthop. 2013 Jun;7(3):245-9. doi: 10.1007/s11832-013-0486-7. Epub 2013 Feb 28.
The effect of tranexamic acid in blood loss and transfusion volume in adolescent idiopathic scoliosis surgery: a single-surgeon experience.
Lykissas MG, Crawford AH, Chan G, Aronson LA, Al-Samiad MJ.

Eur Spine J. 2013 Sep;22(9):1950-7. doi: 10.1007/s00586-013-2774-9. Epub 2013 May 9.
Is tranexamic acid effective and safe in spinal surgery? A meta-analysis of randomized controlled trials.
Li ZJ[1], Fu X, Xing D, Zheng HF, Zang JC, Ma XL.

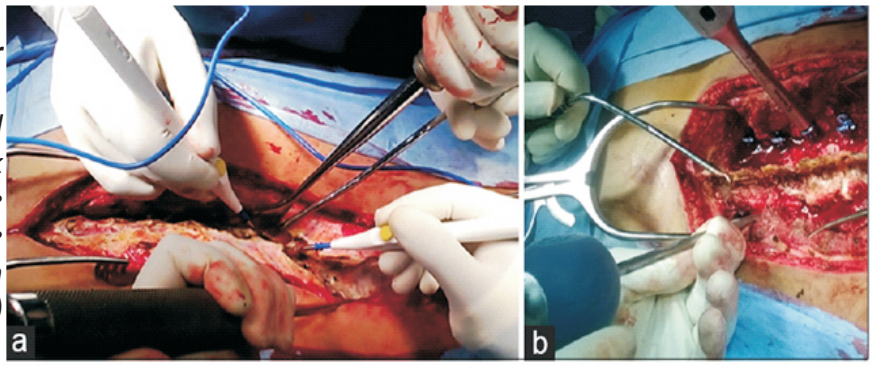
Eur Spine J. 2013 Sep;22(9):2035-8. doi: 10.1007/s00586-013-2858-z. Epub 2013 May 29.
Tranexamic acid reduces postoperative blood loss of degenerative lumbar instability with stenosis in posterior approach lumbar surgery: a randomized controlled trial.
Wang Q[1], Liu J, Fan R, Chen Y, Yu H, Bi Y, Hua Z, Piao M, Guo M, Ren W, Xiang L.

operating long hours , where by the surgeon is at a risk of being not in his best mental and physical agility at the most crucial steps of the surgery. In a team concept of equally trained surgeons operating, the surgeons pitch in at various stages of the surgery to perform the vital and crucial steps of surgery in a fresh state of mind. This has definitely reduced the number of per and perioperative complications of surgery in our practice.

Adapting to special situations:

1. ***Regional anaesthesia in lumbar fusion.***

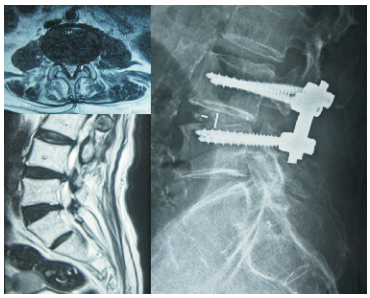
In certain situations where general anaesthesia puts the patient in a high risk situation due to pulmonological issues, like long standing COPD, interstitial lung disease and chronic respiratory failure, lumbar fusion surgery can be done under regional (spinal) anaesthesia.



Regional anaesthesia has been reported to have the following benefits and our experience is in support of these.

- *Lesser anesthetic complications*
- *Lesser post-operative hypertension and CV complications*
- *Lesser post op vomiting*
- *Longer post op analgesia*
- *Shorter hospital stay*

This is ideally suited for lumbar fusion, kyphoplasty and discectomy.



97 yr. old gentleman was operated under regional spinal anaesthesia in prone position for a lumbar spinal canal stenosis at L4-5 with severe neurogenic claudication pain and difficulty in walking. The patient was made to walk the first post-operative day and was well rehabilitated with recovery of painless walking capability.

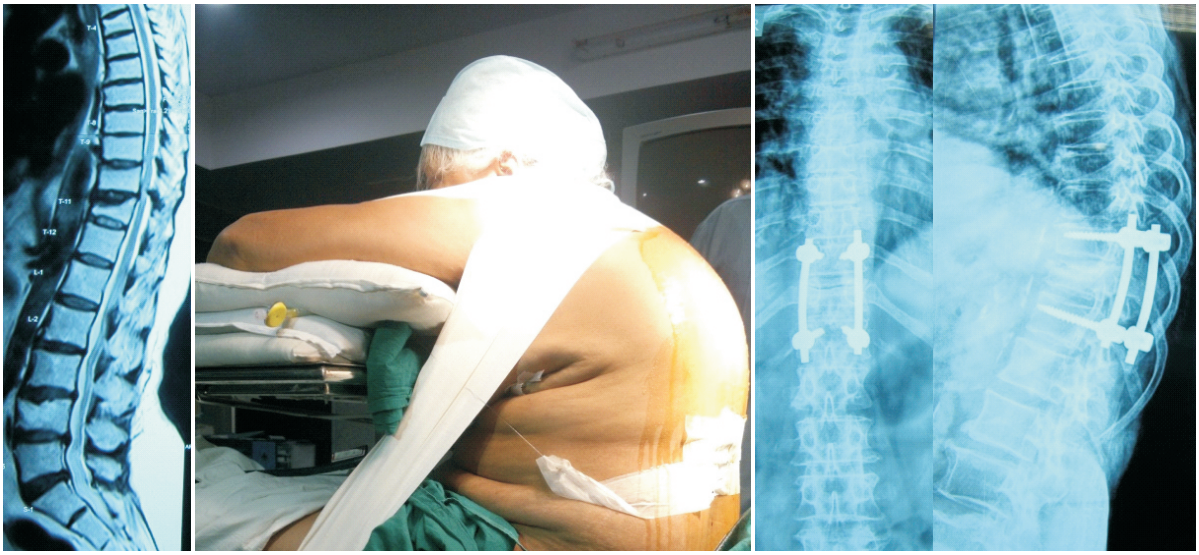
2. ***Surgery in Sitting position and lateral position***

There have been situations when the prone position (which is the commonly used position for lumbar fusion) s
associated with increased risk and hence these patients have been operated in other positions.

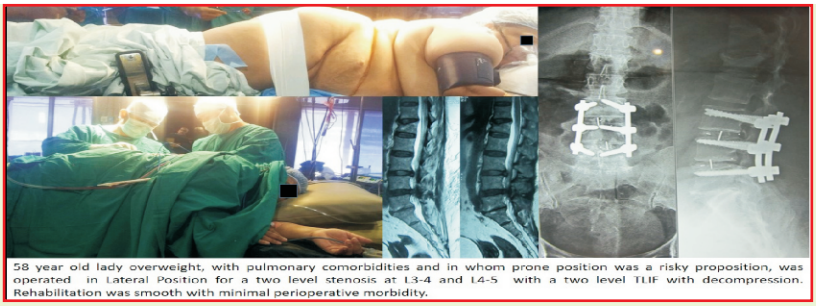
a. ***Sitting Position:*** *offers the advantage of gravity assisted drainage of blood, avoiding suction, favourable lung position, lesser pressure on the eyes and face, but carries a risk of air embolism.*

A 74 year old lady presented with thoracic myelopathy and progressive paraparesis due to D11 vertebral compression fracture with pseudarthrosis and instability. The patient had severe respiratory compromise with advanced COPD. She was assessed by our pulmonology department and was advised against surgery under GA as it carried a very high risk for life. Our anaesthesia team assessed the patient and explained the patient and relatives about the high risk for surgery under GA. However, due to the progressive neurological deficit and cord compression, conservative management was not an option as she was unable to walk with increasing weakness. Considering the situation, option of surgery under epidural anaesthesia was explained. The family was also counseled by our psychiatrist regarding coping with surgical outcome and possible psychological problems in the postoperative period.

Surgery: *With high risk consent the patient was taken for decompression and stabilization surgery. But, the patient was not maintaining saturation even with 45' of reclination. With combined spinal epidural anaesthesia the patient was positioned in sitting posture as shown in the figure, decompression and instrumentation was carried out by our team. This was one of the instances where a combined effort on part of the anaesthesia and surgical teams made this surgical procedure possible. The lady did well postoperatively and was mobilized with help of walker 2 wks later as she showed moderate improvement in neurology with improved back strength. We have lost her follow-up after 6 months postoperatively.*

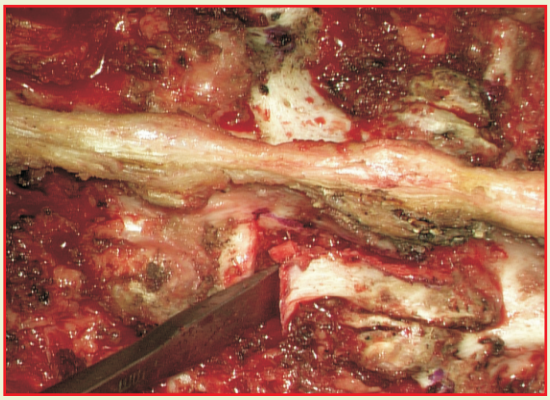


b. ***Lateral Position:*** *The lateral position also is used often in patients where prone position is not possible.*

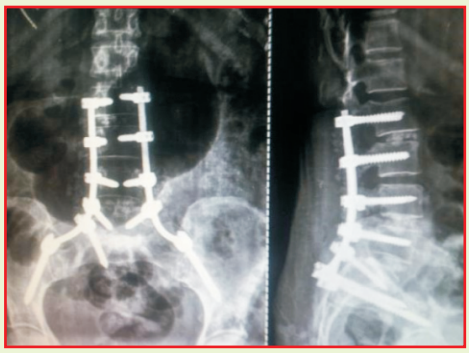


58 year old lady overweight, with pulmonary comorbidities and in whom prone position was a risky proposition, was operated in Lateral Position for a two level stenosis at L3-4 and L4-5 with a two level TLIF with decompression. Rehabilitation was smooth with minimal perioperative morbidity.

3. ***Surgical techniques to decrease the operative time.***



a. *Laminectomy: Often the procedure of laminectomy takes a lot of time to remove the hypertrophied facets and also the often sclerosed lamina. We use an osteotome to break the pars interarticularis and continue the cut in the lamina (as shown in the fig) to completely remove the lamina.*



b. *Use of high speed drill: the use of a high speed drill often is a safer bet than removing the lamina especially in sclerosed laminae, calcified discs and also in failed back surgeries in the presence of scar tissue around the neural elements.*

c. *PLF and PLIF: When the degenerative pathology involves multiple disc levels and need fusion at all the levels, we choose to do interbody fusion (TLIF) only at listhetic segment or segments with maximum stenosis. The remaining levels are fused with posterolateral fusion.*

In our experience which was published , a total of 52 patients were operated with lumbar fusions in the 2-year study period, who were aged 60 years and above and had one or more comorbidities. There were 28 females and 24 males. The average age was 69 years (range 60-84 years). Most common indication for surgery was spondylolisthesis in 17 (32.7%) followed by LCS in 15 (28.8%) patients. Hypertension (HTN) was the most common comorbidity found in 39 patients (75%), followed by diabetes mellitus (Type 2) in thirty patients (56.4%). Twenty patients had single comorbidity while 18 patients had two comorbidities and 13 patients were found to have three comorbidities . Forty six patients were operated under general anesthesia (GA) while the remaining six patients were operated in regional or spinal anesthesia. A total of 11 complications were noted, 3 systemic and 8 localThe average total duration of stay in the hospital was 6.2 days (range 4-14 days).

On comparing the complication rates with other variables, we found that the patients with complications had higher blood loss, operative time, number of instrumented levels, and number of interbody fusion levels .Similarly, the duration of stay was longer in these patients.

On analyzing the correlations between different variables, we found that there was a strong positive correlation of blood loss with operative time, number of instrumented levels, and number of interbody fusions which was statistically significant. Considering the group of population included, the complication rate in our series was within the acceptable limits compared to literature

Table 7: The incidence of complications and factors affecting it described in the literature

Author/year	Average age (range) (years)	Percentage of comorbidities	Average levels fused	Perioperative complication rate	Specific complications	Duration of stay (days)	Factors affecting complications	Factors not affecting complications	Operative time	Blood loss (ml)
Carreon *et al.*, 2003[11]	72	-	-	22% major 70% minor	10% infection, 34% urinary tract infection	-	Age, blood loss, operative time, levels of the arthrodesis	-	-	-
Cho *et al.*, 2007[12]	66.6 (48-83)	-	4.7±2.2	29	-	-	Blood loss, number of instrumented levels, age	Operative time, comorbidities	-	-
Acosta *et al.*, 2011[4]	77 (75-83)	72	10.5 (5-15)	62% overall	38% major, 43% minor	20 (12-43)	Age, hypertension	Approach, number of levels of fusion, other comorbidities, osteotomy	415±253 min (range 99-839 min)	-
Daubs *et al.*, 2007[6]	66.8±6.2	78	9.1±3.2 (5-16)	37% overall 24% intraoperative	20% major, dural tear (7%), iliac vein tear (11%), misplaced pedicle screw (3%), and nerve root injury (3%), death-4%, infection-(4%)	13.5±8.2 (6-43)	Age, osteotomy	Comorbidities	10 h (range 4-18 h)	2056 (range 300-5500)
Zimmerman *et al.*, 2010[13]	56.3±11.0	85	10±2.8	49% overall	26% major, 31% minor, infection (11%)	-	-	Approach	519±160	2735±1928
Sakaura *et al.*, 2013[14]	68.3	-	2	30%	Screw malposition-5%, postoperative radicular pain-10%, root deficits-10%, deep infection-5%	-	-		218±49 min (range 164-393 min)	612±424 (range 160-2000)
This study	69	100	3.8	21%	Dural tear (5.4%), infection (1.8%), persistent radicular pain (1.8%), systemic (5.4%), transient root	6.3	Age, blood loss, operative time, levels of the fusion	Comorbidities	150 min (range 60-270 min)	367.45 (range 90-1050)

This has been published in the Indian Journal of Orthopedics

Original Article

Complication rate during multilevel lumbar fusion in patients above 60 years

Bijjawara Mahesh, Bidre Upendra, S Vijay, GC Arun Kumar, Srinivas Reddy

Mahesh B, Upendra B, Vijay S, Arun Kumar GC, Reddy S. Complication rate during multilevel lumbar fusion in patients above 60 years. Indian J Orthop2017;51:139-46.

It is commonplace to assume that all surgeries and especially spinal fusions in elderly is life threatening and associated with high morbidity. However the advancements in the operative and perioperative management, better pre-operative optimisation of the medical co-morbidities, more emphasis on training of the surgeon and the clinical teams associated, availability of trained surgeons working in tandem as a group and also the inclusion of newer skills, techniques and gadgets along with a comprehensive holistic approach to the problem have gone a long way in making the spinal fusions in elderly an extremely safe and feasible proposition.

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