Reviewer's report

Title: Treatment of adolescent idiopathic scoliosis with segmental pedicle screws and combined local autograft and allograft bone for spinal fusion

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Reviewer: Hitesh Modi

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Comments:

Abstract:
Results- there is no mention about average follow-up. Follow-up is very important on such paper. How did you analyze the fusion? How can there not be any revision surgery, complications or pseudarthrosis?

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Background: authors mentioned that search for other substitute was necessary due to high morbidity associated with iliac crest bone graft. So please give information regarding other bone graft substitutes and associated complications, so that you are using allograft mixed with autograft.

The purpose of this study is to determine the effectiveness of combined local autograft bone and freeze-dried cancellous allograft bone in the treatment of AIS with segmental pedicle screws and dual rod instrumentation. - Purpose is not clear. This is clinical results which will be excellent whatever may be the bone substitute. Purpose should be comparing complications, pseudarthrosis, or risk factors for non-union or infection like that. Clinical results cannot be compared for the success of a bone substitute.

Methods

Retrospective study- effectiveness of bone substitute cannot be checked by retrospective study.

Criteria for surgical correction of AIS included- criteria are not clear. It is general. Suppose patient with 90# curves with Risser sign 0 or 1, what will you do?

The study was approved by the Institutional Review Board of our hospital and informed consent was obtained from all patients and their parents.- How preoperatively or postoperatively. How can IRB approved a retrospective study without any case-control and measuring the effect of bone substitute in fusion.

Surgical Technique:

Anterior discectomy and release was performed in patients with rigid major curves >75° with a correction <50% in bending radiograms.- This means that this study is not with segmental pedicle screws. This is about just treatment of scoliosis with posterior/posterior and anterior combined approach.

Local autograft bone was cut into match-like sticks, combined with freeze-dried
allograft bone, and carefully packed onto the prepared surfaces. - this is the only line in a paper where authors compared the effectiveness of allograft in fusion. I think paper is just clinical and numbers of papers have reported clinical results with allograft mixed with autograft from laminae, pedicle or facet etc.

Possible pseudarthrosis was determined by 1) persistent midline moderate-to-severe back pain, 2) a defect in the fusion mass or an unfused facet visible on radiograph, and 3) curve progression >10° from the initial erect postoperative radiograph - in this short follow-up it is not possible to comment about pseudoarthrosis on radiograms unless you have CT scan evidence. And criteria of possible pseudarthrosis are just assumption not confirmed by operative procedure.

Results-
All patients had a minimum follow-up of 18 months (range, 18 to 40 months). - too short follow-up. Minimum follow-up should be at least 3-5 years to comment on fusion.

At the last follow-up, fusion was found to be complete in all patients, and no cracks were noted. No neurologic, cardiac, pulmonary, or infectious complications occurred. No Cobb angle change >10° between an immediate postoperative radiograph and the last follow-up erect radiograph was found. There was no obvious loss in the correction, and the average loss of correction was 1.1° (range, 0° to 4°). No pull-out of pedicle screws or broken rods was discovered during the follow-up period. No patients had complaints of back pain and all returned to normal school study a month after surgery. - there is no complication in any system in patients with scoliosis which is unbelievable to me. I think patients’ selection must be biased or included only those who did not have any complications. It is not consecutive series.

Discussion
First paragraph- authors might have noticed the follow-up periods. And what is different from those in this paper. All had used allograft mixed with local bone graft. I think most of the patients having scoliosis are being operated with the same method, i.e. local bone with allograft mainly because associated poor bone quality could not give enough amount of bone graft.

Allograft bone is available in a number of shapes, sizes, and types, including fresh, fresh-frozen, or freeze-dried cancellous or cortical bone. - Reference is mandatory.

Asselmeier et al. [10] reviewed more than 1,000,000 freeze-dried allograft transplantations performed since 1951 and found no documented cases of HIV or other viral transmission. - this is not the main concern but persistent serous discharge from the wound or increased wound infection should also be concerned.

Other paragraphs are related with the advantages of segmental pedicle screw and authors said that segmental pedicle screw is associated with less pseudarthrosis. In such situation, what is the purpose of writing about allograft? In limitations: authors agreed that follow-up is very less and curves were very
small. These limitations are enough to say that the study is inappropriate.
Another thing is that whenever reporting about effectiveness of bone substitute, it is important to have 1) follow-up of at least 3-5 years; 2) all surgeries with the same approach; 3) two groups: one treated with allograft with local bone and the other with only iliac crest grafts; 4) all parameters in both groups should be similar; 5) compare the complications and psuedarthrosis or infections in both groups. So it is highly recommended that such study should be case-control study with good follow-up.
Tables are inappropriate and do not give much information.

**Level of interest:** An article of insufficient interest to warrant publication in a scientific/medical journal

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests