Does Type of Bone Graft Used in Spinal Fusion Increase Risk of Infection?

So, you or someone you know is planning on having a spinal fusion. Lots of thoughts go through your mind as you prepare for the big day. Meanwhile, your surgeon is also giving the procedure some preplanning and preparation. Everything that can be done to minimize infection or other postoperative problems is considered. The surgeon will choose what type of bone graft material to use alongside and between the vertebral bodies help jump start the healing process and successful fusion.

By now you may be wondering what type of bone graft materials are there to choose from? Which one will you be getting? Bone grafts are either autografts (harvested from the patient) or allografts (obtained from a donor bank). The allografts may be irradiated as part of the sterilization process since they come from someone else. Allografts can also be nonirradiated. That leave the autografts, irradiated allografts, and nonirradiated allografts.

Each type of grafting material has its own advantages and disadvantages. Autografts are often considered the best choice or the gold standard. Using your own bone means there won't be any issues with tissue rejection. And since it's live bone when it's harvested, it helps stimulate new bone growth at the surgical site much faster and more efficiently than allografts. The major disadvantage of autografts is persistent and sometimes disabling pain at the donor site. A minor inconvenience is the extra time during surgery to collect bone from some other site. Autografts for spinal fusion usually come from bone removed from the spine (e.g., laminae or spinous process) or from the crest of the pelvic bone.

Allografts on the other hand create no donor site problems, but fusion takes longer and there is a risk of transferring an infection to the recipient. That's why donors are screened very carefully before being accepted and the donor tissue is sterilized using gamma irradiation techniques. Advantages of allografts include shorter surgical time, availability of preformed shapes and sizes of donor tissue, and as mentioned, there's no pain from bone collection.

But what about infection? Is the risk of postoperative infection any greater with one type of graft over another? That's the question surgeons from the Mayo Clinic in Rochester, Minnesota addressed with this study. In fact, they say this is the first study to look at the risk of infection based on graft type. Over 1,000 patients were included (1,435 to be exact). They all had a spinal fusion with one of three graft types. Most had the autograft (850) but there were 144 who received an irradiated allograft and 441 with nonirradiated allografts.

Infection in the early days, weeks, and months after spinal fusion with bone grafting isn't just an isolated problem. With osteomyelitis (infection enters the bone), failure of getting a solid fusion, and pseudoarthrosis (movement at the fusion site), there is only one potential risk factor. Patient age (older than 60 years old), tobacco use, diabetes, obesity, and alcohol abuse increase the risk of infection. Length of surgery and surgical technique can also add to the risk of infection postoperatively.

When all the data was collected and analyzed for this large group of patients, there was NO difference in postoperative infection rate based on type of bone graft used. That means the surgeon can choose the type of bone graft based on the patient's needs (e.g., autograft versus allograft, and what's needed for the particular surgical procedure planned. Patients were followed for at least one full year after surgery. The overall infection rate for all three types of grafts was only five per cent. Most of the infections that did occur developed within the first 60 days.

The authors suggest other areas in need of investigation include whether irradiation affects fusion (not infection) rates and if type of bone graft used affects fusion rates. This one study does not prove conclusively that infection is never linked with the type of graft used. There may be risk factors or other predictive factors associated with graft type that increases the likelihood of postoperative infection. There is plenty of room for further study of this matter.

Reference: