



Clinical commentary

Preoperative embolization in spinal tumour surgery: Enhancing its effectiveness



Barry Wei Loong Tan^a, Aye Sandar Zaw^a, Prapul Chander Rajendran^b, John Nathaniel Ruiz^a, Naresh Kumar^{a,*}, Gopinathan Anil^b

^a Department of Orthopaedic Surgery, National University Hospital, Singapore 119074, Singapore

^b Department of Diagnostic Imaging, National University Hospital, Singapore 119074, Singapore

ARTICLE INFO

Article history:

Received 27 February 2017

Accepted 22 May 2017

Keywords:

Preoperative embolization

Spinal tumour surgery

Metastatic spine diseases

Blood loss

Blood transfusion

ABSTRACT

We conducted a retrospective review of 221 patients, who underwent spinal oncologic surgery at a tertiary university hospital between 2005 and 2014; in order to identify and validate factors that influence the impact of preoperative embolization of spinal tumours on outcome measures of blood loss and transfusion requirements in spinal oncologic surgery. We also focused on primary tumour type and type of spinal surgery performed. Patients' electronic and physical records were reviewed to provide demographic data, tumour characteristics, embolization techniques and surgical procedure details. These data were analysed against recorded outcome measures of blood loss (absolute volume and haemoglobin reduction) and transfusion requirements. Forty eight patients who received preoperative embolization were compared against 173 patients who did not. There was a tendency towards reduced blood loss and transfusion requirements in embolized spinal metastases from HCC and thyroid; as well as primary spine tumours, though the differences were not significant. Total embolization of arterial supply to spinal tumours resulted in significantly less blood loss as compared to partial or subtotal embolization. In addition, median blood loss was lower in patients receiving a more proximal embolization and in patients who underwent surgery between 13 and 24 h post-embolization despite the insignificant difference. To conclude, preoperative spinal tumour embolization is likely to be effective in reducing blood loss if a total embolization is performed 13–24 h prior to the surgery. Similarly, the impact of embolization is likely to be more profound in metastases from HCC, thyroid and primary spine tumours.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

The spine is the prime target in the skeletal system as a metastatic site for primary tumours of epithelial origin [1]. Spinal oncologic surgeries aimed at decompression and stabilization of the neural and osseous elements respectively remains an integral part in management of the quality of life of patients with metastatic spine disease (MSD). Due to the vast spectrum of patterns and severity of spinal metastases, a multitude of techniques are employed for the overall treatment of MSD.

Preoperative transarterial embolization of spinal tumours is a tool that has evolved over a period of time applied to reduce

perioperative blood loss and surgical complexity [2,3]. It is a minimally invasive angiographic intervention to facilitate surgical resection of spinal malignancies based on the premise of reducing the arterial supply of tumours and hence reduce intraoperative bleeding. The current treatment paradigm utilizes preoperative embolization mainly for hypervascular tumours such as metastases from renal cell carcinoma, hepatocellular carcinoma and thyroid carcinoma [2,4–8].

There is a clear association between preoperative embolization and reduction in surgical blood loss when applied to hypervascular tumours based on the existing literature. However, there is a paucity of data with regards to: (i) application of preoperative embolization on spinal malignancies not traditionally regarded as hypervascular, (ii) comparison of blood loss in best-matched embolized and non-embolized cases, (iii) factors which influence the success and effectiveness of preoperative embolization in terms of patient clinical data, embolization type and type of surgical technique employed.

Abbreviations: MSD, metastatic spine diseases; PVA, polyvinyl alcohol particles.

* Corresponding author at: Department of Orthopaedic Surgery, University Orthopaedics, Hand & Reconstructive Microsurgery Cluster, 1E Kent Ridge Road, NUHS Tower Block, Level 11, Singapore 119074, Singapore. Fax: +65 67780720.

E-mail address: dosksn@nus.edu.sg (N. Kumar).

A better understanding of factors influencing the success of embolization will allow us to select and optimize cases, which is vital in maximizing the utility of this therapeutic modality in a more effective manner for better outcomes. In light of this, our retrospective review aims to determine the factors which impact the outcome of preoperative embolization and compare blood loss in embolized and non-embolized cases taking into focused consideration the type of primary tumour, embolization technique and the type of spinal surgery employed.

2. Materials and methods

2.1. Study design and data collection

After Institutional Review Board approval, we performed a retrospective review on patients who underwent spinal oncologic surgery in our institution over a 10-year period (2005–2014). We included all oncology cases (primary and metastatic spinal tumours), who underwent open surgical procedures. Data was extracted via surgical codes from electronic records.

The cases were then classified into two major groups – those who received preoperative embolization and those who did not. Each group was then substratified based on tumour type into 9 sub-groups: renal cell carcinoma (RCC), hepatocellular carcinoma (HCC), thyroid carcinoma, lung carcinoma, breast carcinoma, gastrointestinal carcinoma (pancreas, gastric, colorectal), others (epithelial tumours such as endometrial, cervical and prostatic), myeloma/lymphoma and primary spine tumours (e.g. giant cell tumours, aneurysmal bone cyst, osteoblastoma, sacral chondroma).

Subsequently, all cases were then substratified based on 3 types of surgery: Type (I) cervical spine surgery (either anterior and/or posterior stabilization with or without corpectomy), Type (II) thoracolumbar posterior instrumentation and decompression, Type (III) thoracolumbar corpectomy. The surgical procedures were performed by one of four senior orthopedic spine surgeon consultants.

2.2. Outcome measures

Outcome measures obtained for were blood loss and transfusion requirements. Blood loss was determined by the operating surgeon and consultant anesthetist at the end of surgery and/or by calculating the difference in pre and post-operative haemoglobin levels taking into consideration the units of blood transfused during the operative procedure.

2.3. Preoperative embolization

In all the cases, embolization was performed within 48 h prior to surgery following an informed consent. The procedure was performed under local anesthesia using a transfemoral approach by an interventional radiologist. All the arteries that could potentially supply the tumor to be operated upon were selectively cannulated and angiography was performed. This determined the tumor vascularity as well as identified any radiculo-medullary artery arising from the tumor-feeding vessel. The presence of shared supply to the spinal cord and tumour was considered as a contraindication to embolization (Figs. 1a and 1b) or reason for limited or proximal embolization with coils. Different embolic agents were used depending on the operator's preference, tumor vascularity and availability. The majority of embolizations were performed with particles i.e. either gel foam slurry or polyvinyl alcohol (PVA). In certain cases, metallic coils were used for more proximal embolization as an adjunct to distal embolization with particles; while in a few others, it was done if distal embolization with particles was



Fig. 1a. Selective embolisation of a feeding artery using PVA particles.



Fig. 1b. Post-embolization showing absence of tumour blush.

not possible or deemed unsafe. Sluggish antegrade flow was the end point of embolization for each tumor-feeding artery.

According to the level from where the tumor feeding artery was embolized, we categorized the patients into 2 groups – selective occlusion (Figs. 1a and 1b), which entailed super-selective occlusion of the tumor feeding artery with particles and proximal occlusion (Figs. 2a and 2b) where the tumor feeding artery was occluded proximally with coils or by flow directed embolization without selective cannulation of the tumor feeding artery. The completeness of the embolization was based on the degree of devascularization, assessed retrospectively through review of pre and post-embolization angiographic images. The pre-embolization angiographic appearance was classified as hypervascular or capillary phase tumoral blush. The former angiographic appearance showed early arterial phase enhancement/hypertrophic tortuous feeding arteries/intratumoral pooling of contrast/intratumoral arteriovenous shunts. The latter included angiographic blush more than neighbouring normal vertebra appreciated only in the capillary phase of the angiogram and not showing any of the features required to qualify as a hypervascular tumor. The interventional radiologist's report was reviewed for details of the technique, the embolization material used and for complications.

For statistical comparison, extent of embolization was categorized into 3 groups, based on reduction in the amount of post-embolization tumour blush – partial (<50%), subtotal (50–80%) and total (>80%); embolization agents into 3 groups – (1) gel foam,

Download English Version:

<https://daneshyari.com/en/article/5629639>

Download Persian Version:

<https://daneshyari.com/article/5629639>

[Daneshyari.com](https://daneshyari.com)