

## CASE REPORT

# A case of thoracic esophageal cancer undergone esophagectomy after induction chemotherapy in a Jehovah's Witness

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**Abstract :** We report the case of a 50-year-old female Jehovah's Witness with advanced esophageal cancer who underwent esophagectomy following induction chemotherapy. She visited our hospital complaining of dysphagia and was diagnosed of advanced esophageal cancer by upper endoscopy. She refused allogeneic transfusion. Induction chemotherapy was performed. Severe anemia occurred as an adverse event. A subtotal esophagectomy was performed after her anemia improved. During the surgery, a large volume of replacement fluid was injected, the blood was diluted, and intraoperative bleeding was relatively reduced. Intraoperative blood salvage was made using Cell Saver. The postoperative course were stable by using autologous blood and albumin infusion. The patient was discharged on postoperative day 27. Jehovah's Witnesses with gastrointestinal malignancies can be treated safely by performing surgical therapy based on blood replacement therapy and autologous blood transfusion. *J. Med. Invest.* 62 : 264-267, August, 2015

**Keywords :** *esophageal carcinoma, Jehovah's Witness, autologous blood transfusion*

### BACKGROUND :

Various problems arise during surgery for Jehovah's Witnesses where there is a possibility of a certain amount of bleeding because these individuals refuse blood transfusions on religious grounds. The progress of the tumor and general conditions of the patient influence the indications for bloodless therapy. A Jehovah's Witness with advanced esophageal cancer was safely treated by subtotal esophagectomy following to induction chemotherapy. Here we reported the perioperative management of this case.

### CASE PRESENTATION :

A 50-year-old female presented the chief complaints of anorexia, weight loss, and dysphagia. She had a history of dysphagia three months prior to visiting our department. She was diagnosed of advanced esophageal cancer by upper endoscopy. The patient informed us that she was a Jehovah's Witness. Blood biochemistry findings showed decreased hemoglobin of 11.4 g/dL and increased levels of squamous cell carcinoma antigen of 3.6 ng/mL (normal range < 1.5 mg/mL). Upper endoscopy showed a stricture of the upper thoracic esophagus, which made passage of the endoscope difficult (Fig. 1a). The result of a biopsy was diagnosed of squamous cell carcinoma. Computed tomography (CT) showed thickening of the esophageal wall in the upper and lower thoracic esophagus (Fig. 1b, c) and mediastinal lymph node metastasis. Induction chemotherapy was chosen because we judged it to be resectable after reduction. Chemotherapy using weekly docetaxel plus low-dose cisplatin and 5-fluorouracil (1) was started. After starting chemotherapy, the patient appeared grade 3 leukopenia. After 1

week of rest, chemotherapy was resumed. But she appeared grade 4 leukopenia and grade 3 anemia after chemotherapy. She was given oral doses of folic acid, vitamin B12 and iron. The tumor of upper esophagus was found to have completely disappeared on upper endoscopy (Fig. 2a), whereas the tumor of lower esophagus had shrunk but still remained. CT scan also showed marked reduction of the both lesions of the upper and lower thoracic esophagus (Fig. 2b, c), further showed reduction of lymph nodes. We judged partial response from their results after induction chemotherapy. Two weeks prior to surgery, the patient was intramuscular injection of erythropoietin (6000 U) to increase hemoglobin levels to 11.7 g/dL for surgery (Fig. 3). The attending physician, anesthesiologist and the patient signed a liability waiver for blood transfusion refusal before surgery. Although the patient refused blood products, she approved a preoperative hemodilution, intraoperative blood salvage and postoperative autologous blood transfusion with salvaged blood. She also approved the use of plasma derivatives.

**Intraoperative findings :** We rapidly infused a large amount of Ringer solution and blood substitute after inducing anesthesia, diluted the blood, and relatively reduced intraoperative bleeding. The patient's hemoglobin level was diluted to 8.4 g/dL. We used intraoperative blood salvage using "Cell Saver®". A total of 200 mL of blood was collected. We started the thorascopic surgery in the lateral decubitus position. The tumor in the lower esophagus had invaded to the aorta, and it was judged unresectable. Non curative resection was performed. A narrow gastric tube was made and anastomosed with hand suture through the retrosternal route. The operative time was 9 hours 43 minutes and the total amount of bleeding was 650 mL.

During the 3 days after surgery, the patient was withdrawn from the respirator. The hemoglobin level decreased to 7.7 g/dL after surgery. Iron administration and 200 mL of intraoperative salvaged blood transfusion were performed. The hemoglobin level increased to 9.0 g/dL (Fig. 4). Postoperative complications included aspiration pneumonia associated with left recurrent laryngeal nerve paralysis and prolonged chylothorax. However, these improved

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with conservative treatment, and the patient was discharged on the postoperative day 27.

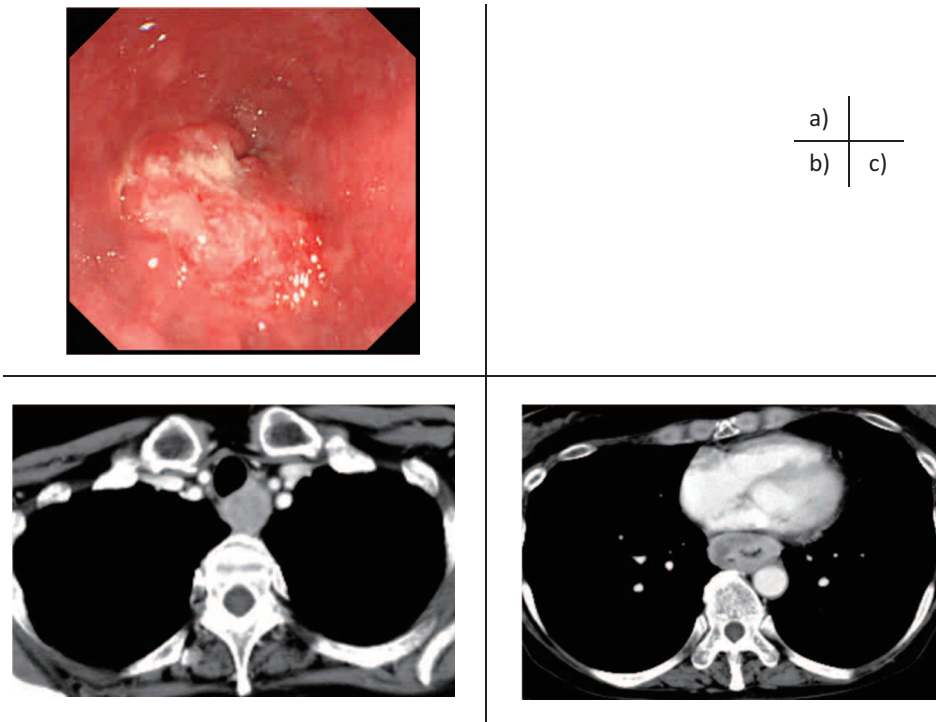


Fig. 1 : Pretherapeutic findings. Upper endoscopy on admission shows a tumor covering more than half of the upper thoracic esophagus, which made passage of the endoscope difficult (a). Chest computed tomography (CT) on admission shows thickening of the esophageal wall in the upper (b) and lower (c) thoracic esophagus.

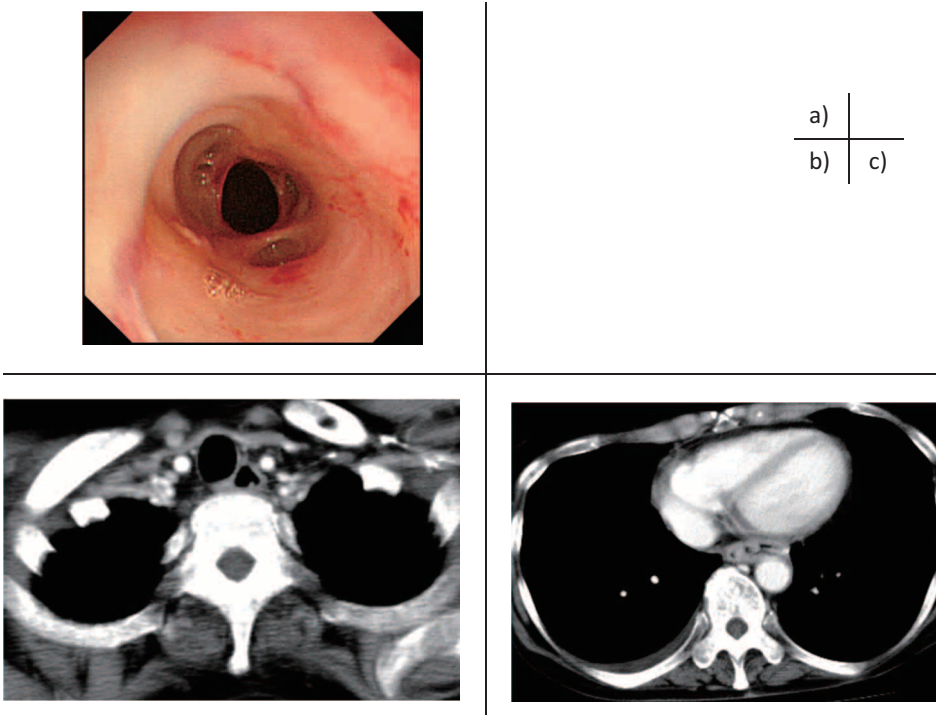


Fig. 2 : Post-chemotherapeutic findings. Endoscopy shows the lesion in the upper esophagus was completely disappeared (a). CT shows marked reduction of the lesion both in the upper (b) and lower (c) thoracic esophagus.

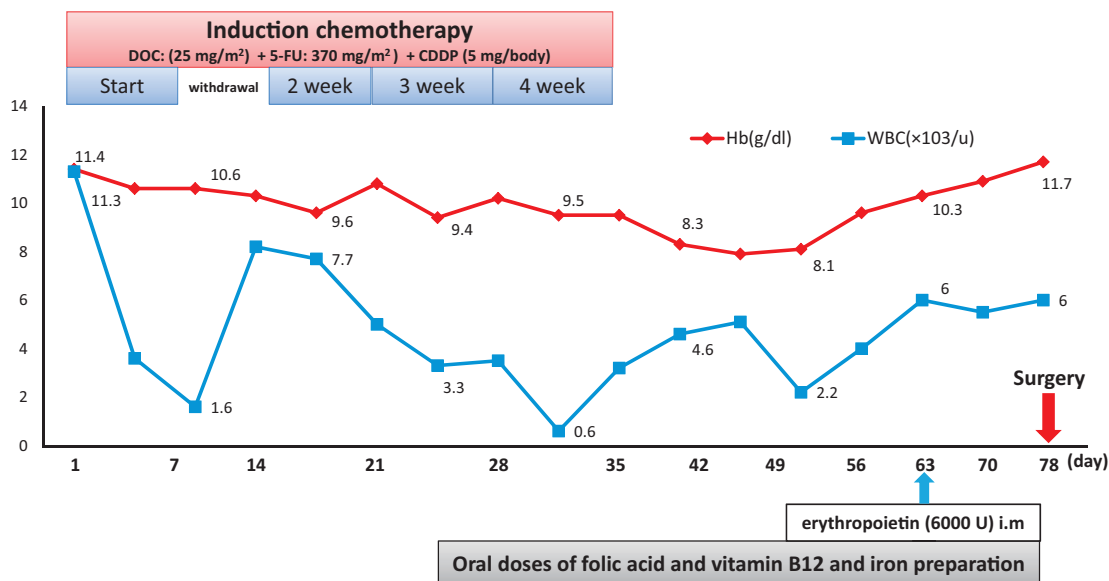


Fig. 3 : Transition of white blood cells and hemoglobin after starting of chemotherapy. The patient was done blood-forming therapy. Two weeks prior to the surgery, the patient was intramuscular injection of erythropoietin (6000 U) to increase her preoperative hemoglobin levels to 11.7 g/dL.

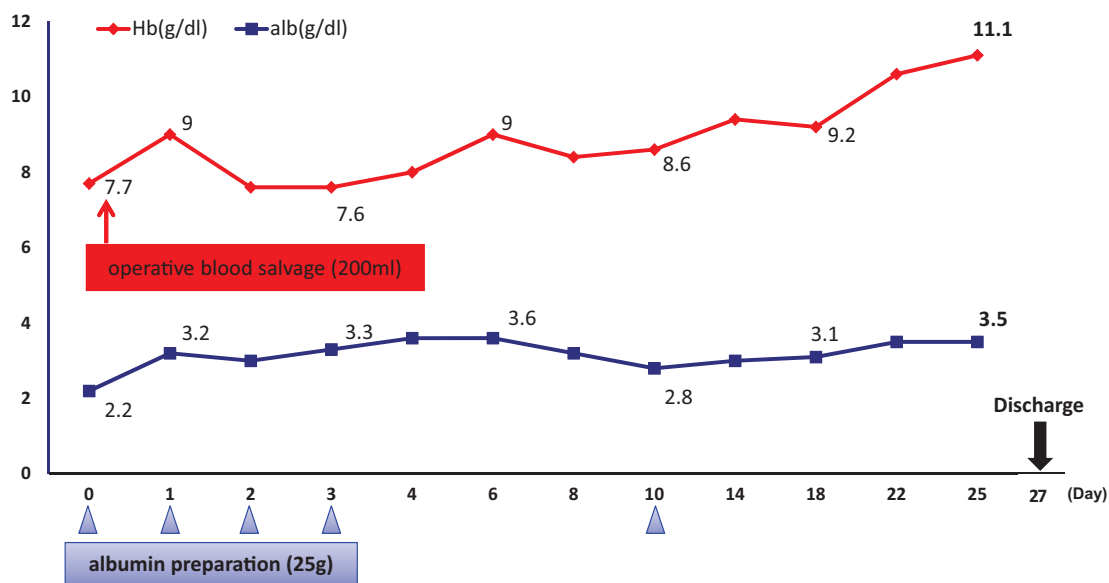


Fig. 4 : Transition of hemoglobin and albumin of postoperative. The serum albumin was increased by albumin preparations. The hemoglobin level increased to 9.0 g/dL by injected iron and intraoperative blood salvage.

DISCUSSION :

Jehovah's Witnesses refuse blood infusion on religious grounds. However, restrictions on use of blood products have variation. When obtaining informed consent from patients who are Jehovah's Witnesses, the surgeon and anesthesiologist must sign an agreement with the patient for the deed of indemnity. The surgeon also must explain the need for preoperatively diluted and intraoperatively blood salvage and albumin preparations, describe the estimated amount of bleeding to the patient and their family, and obtain their consent (2, 3).

Therapeutic outcomes for Jehovah's Witnesses including the field of cardiovascular surgery (4) and liver transplant (5) were reported. However, there is no fixed opinion regarding therapeutic

indications for Jehovah's Witnesses with malignant tumors (6, 7). Differences in the surgical procedure invasiveness, the disease progression and concomitant anemia are considered to influence the surgical indications. Preoperative blood-forming therapy and autologous blood transfusions can be expand the treatment selection. Blood-forming therapy including iron and folic acid supplements, vitamin B12, and erythropoietin was performed in our case. Subtotal esophagectomy could be done safely with postoperative autologous blood transfusions.

Autologous blood transfusion is classified broadly into (1) predeposit autologous donation (PAD), (2) acute normovolemic hemodilution (ANH), and (3) perioperative cell salvage (PCS). PAD involves collection of the patient's blood in preparation for surgery. But doctrine of Jehovah's Witnesses cannot be accepted because

of collecting blood has been separated from the body. ANH is a method in which autologous blood is collected prior to surgery and diluted by supplementing decrease of circulating blood volume using Ringer's lactate and plasma substitutes. Because the blood is dilution, actual blood loss can be suppressed. The collected blood is physiologically superior in terms of hemostatic effect and oxygen-carrying capacity and therefore has the advantage. PCS is frequently used to reduce the amount allogeneic blood in cardiovascular surgery (2). Similar to ANH, PCS is acceptable under the doctrine of Jehovah's Witnesses because blood is not separated from the circulatory system. Various complications that occur during PCS have been reported, including sepsis and distant metastasis due to bacteria and cancer cells that are mixed within the circuit (8). Autologous blood was not collected during dissection of the T4 tumor of the lower esophagus, because tumor contamination was expected. As for safety and long-term follow-up results of cancer surgery, few clinical problems have reported (9-11).

We found two reports by searching the Japan Medical Abstracts Society and PubMed databases using the keywords "Jehovah's Witness" and "esophagectomy" from 1994 to the present (12). Subtotal esophagectomy had been performed in two cases of esophageal cancer and the amount of intraoperative bleeding was approximately 800 mL in both the cases. In one case was used ANH alone and in the other was used a combination of ANH and PCS, and no intraoperative or postoperative problems occurred in both. Postoperative complications were observed in several patients whose amount of bleeding due to hepatectomy or pancreatectomy exceeded 2,000 mL, and some patients died after surgery (12). No reports of esophageal resection following neoadjuvant chemotherapy were found. But we found the reports of other cancers in which anemia and thrombocytopenia were problems related to neoadjuvant chemotherapy (13, 14). The patients in these reports also underwent blood-forming therapy, and surgery was performed by combining PCS with ANH.

Avoidance of blood transfusions of Jehovah's Witnesses does not mean that they accept death by refusing necessary treatments. Physicians therefore need to treat these patients while respecting their right to self-determination by applying any techniques that do not involve blood transfusion. Blood transfusion and fresh frozen plasma can be avoided by performing alternative therapies to blood transfusions. We believe that treatments based on a blood replacement therapy and autologous blood transfusions can widen the range of surgical indications, including those for neoadjuvant chemotherapy, in Jehovah's Witnesses with gastrointestinal malignancies.

## CONCLUSIONS :

We treated a Jehovah's Witness with advanced esophageal cancer who safely underwent subtotal esophagectomy following to neoadjuvant chemotherapy. We could expand the therapeutic indications of Jehovah's Witnesses with gastrointestinal malignancies by using blood replacement and autologous blood transfusion.

## CONSENT :

Written informed consent was obtained from the patient for publication of this Case report and the accompanying images. A copy of the written consent is available for review by the Editor of this

journal.

Abbreviations : PAD : predeposit autologous donation ; ANH : acute normovolemic hemodilution ; PCS : perioperative cell salvage.

## COMPETING INTERESTS :

The authors declare that they have no competing interests.

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