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Title: The effect of surgery on thoraco abdominal volumes in congenital diaphragmatic hernia (CDH) patients

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Body: CDH consists of an incomplete formation of the diaphragm and the subsequent erniation of abdominal bowels. Two kinds of reconstructive surgery are usually applied in CDH: when enough diaphragmatic tissue is present, primary suture of flaps is performed; in case of a large defect of the diaphragm, a diaphragmatic patch is used to avoid a straight hemidiaphragm. Functional evaluation is a problem, since the patients are babies and often uncooperative. The aim of the study was to assess thoraco-abdominal volume in CDH patients by opto-electronic plethysmography, which obviates the problem of patient cooperation. Fourteen CDH patients (7M/7F, age 5±2yrs) and 9 healthy control subjects (9M, age 7±3yrs) were studied during 3 minutes of quiet breathing in supine position. Patients were divided in 2 groups based on the kind of surgery: 5 patients with suture (group S) and 9 patients with diaphragmatic patch (group P). In overall CDH, the abdomen was the main contributor to tidal volume (V_T), but it was significantly lower than controls, whereas the upper and lower rib cage had a higher contribution to V_T . In patients belonging to group P abdominal volume variations were lower than group S (see fig.). In conclusion, in CDH the mobility of the diaphragm is reduced compared to controls and inspiratory rib cage muscle must be used to compensate this reduced mobility. Diaphragmatic patch further reduces diaphragm mobility.