Sustainable development in the operating room: the contribution of anesthesia specialists

The Paris Saint-Joseph Hospital Group (GHPSJ) is a private non-profit hospital. It is the result of the merger of 3 institutions plus the Paris Saint-Joseph Nursing Training Institute. It has 669 beds and rooms. In 2017, the activity of the hospital group included 18,500 patients taken care in the operating room, nearly 70,000 stays, more than 50,000 emergency room visits and 3,557 births.

The technical department is an important section, with 20 operating rooms, an endoscopy and proctology unit, 4 hybrid operating rooms and finally a maternity ward with 2 operating rooms and 9 birth rooms.

The anesthesia team is able to provide a service that meets this capacity: 42 anesthesiologist doctors and 40 anesthesiologist nurses (IADE) provide anesthesia for all the medical specialties: orthopedic, vascular, urological (with surgical robot), gynecology, ENT, ophthalmological, plastic, digestive, bariatric, maxillofacial, proctological, digestive endoscopy, heart surgery, and radiology unit.

Dräger: Can you please introduce us to your institution? Capacity, specialties, status, history or any other specific information?

The Paris Saint Joseph Hospital Group (GHPSJ) is a very important institution in the centre of Paris. Eager to make continuous progress, it offers an internal exchange forum to improve, among other things, medical practices. Corinne Blanche is an anesthesiologist nurse chief in the anesthesiology department, who agreed to answer our questions regarding one of these improvements. She shares her experience in the field of anesthesia, both regarding awareness and actions in the field of sustainable development.
Dräger: Could you please introduce yourself? Your role, your career, your daily tasks?

I am an anesthesiologist nurse chief at GHPSJ since January 2016. As a nurse, I was always determined and I always wanted to work in the field of anesthesia! So I pursued the IADE diploma and then, as my career progressed, I worked in public or private institutions. After 16 years of IADE experience, I was trained as a health executive and now I work as an anesthesiologist nurse chief within the GHPSJ. My daily tasks involve managing the team, the pharmacy stock and also following up on the consecutive projects that boost the team. For this purpose, I have scheduled anesthesia seminars twice a year. Two IADE work together with an anesthesiologist to conduct a presentation for the entire team. The presentations are both related to physicians and IADE, either in connection with an incident that we encountered during the year (for example, regarding malignant hyperthermia) or in relation to an evolution of medical material or practice. Generally these seminars are held on a single day, Saturday, and we also have access to our simulation lab, which is a very good training tool.

Dräger: Why are you interested in sustainable development? What is the role of anesthesia in this field?

Sustainable development is an issue that concerns us all and especially anesthesiologists, since we use gases that have significant polluting power. For example, the impact of Desflurane® is ten times greater than Sevoflurane® and the lifetime in the atmosphere is significant: 9 to 21 years and 1.2 to 4 years respectively. Nonetheless, like a majority of operating rooms, our rooms are equipped with AGGS outlets that allow the extraction of anesthetic gases to protect the nursing staff. Nevertheless, the gases are released outside and pollute the atmosphere.

Dräger: What was your project?

As I observed our consumption, I realized that our consumption of halogens was quite high and I also noticed that the flow rate of fresh gas in the room was relatively high. With the head of the department, we enquired about the quality of laryngeal masks. After an audit, it turned out that our masks were of good quality: when using a well positioned mask of a good size, there was no leak that could explain this overconsumption. Finally, the hypothesis was unfounded and this audit made it possible to highlight that the flow rates of fresh gas were too high, and there was no reason to have flow rates higher than 0.8 l/min. - 1 l/min.

Considering the related economic impact did not affect the teams, nor was it the approach that interested me most in this process. We therefore tackled this issue from the environmental impact perspective, particularly the polluting power of the various halogenated gases and nitrous oxide. This was the first step of the project. We conducted a bibliographic search on the carbon footprint of the different molecules. During an anesthesia seminar, I made a presentation together with an IADE, titled «Flow rate of fresh gas and the laryngeal mask». We demonstrated the ecological impact of the consumption of different halogenated gases and nitrous oxide. This was the second step. During the Forum for Innovative Organizations, I prepared a poster summarizing all the data with the IADE dedicated to pharmacy. This GHPSJ-specific forum allows staff to present an idea to improve the practices and organization within.

A year later, a second student conducted an audit on anesthetic practices: what was the user’s actual level of gas flow,
depending on the mode of connection with the upper airways: laryngeal mask or oral/nasal intubation.

Dräger: What are the results? How did the team collaborate?

In terms of medical practice, we no longer use nitrous oxide and the flow rate of fresh gas has decreased significantly. Before the first report, we set our Primus® up to 2.5 l/min. After the first report, we reached 1-1.5 l/min. Some IADE health executives decreased their flow rate below 0.7 l/min regardless of the respirator, whether Primus or Perseus®.

The presentation of the poster and its display at the presentation had a significant impact. The repetition of this message is the key to success: at the Forum, the seminar and each audit report. So the circle is complete! Overall the team collaborated well and after each new intern starts working at the institution, we repeat the message. Even the youngest ones already have a regular routine! Everyone at the GHPSJ is much more interested in sustainable development than in the economic side of things. As long as we were discussing economic issues, the team had no awareness of the overall situation. As soon as we talked about the environment and pollution, everyone felt involved. In the end, the reduction of halogens amounted to 20,000 in 2017, and even more in 2016. We are saving money and reducing our impact on the environment: it’s exciting!

Dräger: How did your current anesthetic machines, Perseus A500 and Primus, achieve these results?

I think we achieved these results thanks to the precision of the devices. The fact that there are no leaks: when we test a respirator, it often detects a 5 or 10 ml leak, which really is nothing! It is clear that we could not have this precision with a mechanical flowmeter machine. The Primus and Perseus A500 respirator machine technology enables us to achieve these results and make changes.
**Dräger: And today, where do you stand? What is the next step?**

Today, when every new intern begins to work at the institution, we repeat the message, and I think I will report our gas consumption each year in order to monitor it. My next step will be to teach them to keep the circuit closed and, especially, not to reopen it at the end of the operation. I realized that in order to recover the patient, the ventilator displayed 18 l/min! I explained to the user that, in anticipation of recovery, the ventilator could remain at 1 l/min, or even be increased to 3-4 l/min, but there was absolutely no need to begin with 18 l/min. So I started by closing off the circuit, and my next step is to teach them how to keep the circuit closed even at the end of the operation, merely by anticipating reanimation.

In conclusion, in relation to this approach, we must disseminate information and constantly repeat it. All in all, it took us two years to reach this result and it requires permanent follow-up; anesthetic practices can deviate very quickly. Monitoring the monthly consumption of halogenated gas bottles is a good indicator and, for example, I observe a peak in May, when new interns start working at the hospital! Training young interns is crucial for adopting good practices right from the start.

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